



***NUEVA RED ALTIMETRICA***  
***PARA EL***  
***MUNICIPIO DE ITUZAINGO***

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# **PRACTICA PROFESIONAL y TESINA**

## **PROFESORES**

**LIC. RAÚL GORROÑO**

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## RESUMEN

El presente trabajo tiene como fin la elaboración de un proyecto para la actualización de la red altimétrica existente en el ejido municipal de Ituzaingo. Para ello se ha realizado un relevamiento de la situación actual y se propone la instalación de nuevos puntos de referencia para cubrir en forma adecuada toda la superficie del municipio. Se ha procedido a medir un polígono a modo de prueba para ajustar la metodología de medición y se detallan todas las operaciones previstas para lograr el propósito buscado.



## ABSTRACT

The present work has the final purpose of project elaboration for the update of the existing altimetric net in the Ejido Municipal of Ituzaingo. For this, it has been made a survey of the present situation and the installation of a new datum points sets out to cover in suitable form all the surface with the Municipalidad. A polygon (polygonal region) was measured as a test to fit the measurement method and all the anticipated operations are detailed to obtain the searched.



## INTRODUCCIÓN

En el año 2004 un grupo de colegas perteneciente al Distrito VIII del CPA, se disponía a realizar un levantamiento planialtimétrico del ejido municipal de Ituzaingo, durante la etapa de planificación de las tareas se solicitó información al municipio, el que proporcionó un listado de 85 puntos fijos, ménsulas pertenecientes a la Dirección de Geodesia de la Provincia de Buenos Aires, la mayor parte de dichos puntos están ubicados dentro de los límites del Partido y una pequeña cantidad de los mismos, se encuentran en el límite en sectores pertenecientes a los municipios de Morón, Merlo y Hurlingham. De aquellos 85 puntos de nivelación, se sabía que no estaban todos y que la mayor parte de ellos se encontraban en el sector urbano mas antiguo, en la zona cercana a la estación del ferrocarril (sector Sud Este). En charlas posteriores a los trabajos de nivelación, algunos de los colegas participantes, comentaron que de los puntos originales, faltaban muchos y que en el sector Nor Oeste prácticamente no había puntos cercanos en los cuales apoyarse para los trabajos. Dado que las tareas a realizar en aquel momento tenían cierta premura no se pudo plantear en el inicio de los trabajos la Actualización de la Red Altimétrica del Municipio de Ituzaingo, hoy con aquella urgencia superada, parece oportuno plantear dicha actualización, máxime teniendo en cuenta que la red existente fue construida por la provincia de Buenos Aires hace mas de treinta años.



## **NUEVA RED ALTIMÉTRICA**

### ***Análisis de los puntos existentes***

Con los listados proporcionados por el municipio en el año 2004, se realizó un recorrido por todo el partido para corroborar la existencia de cada una de las ménsulas existentes. Como resultado de esta verificación se estableció que de 85 puntos fijos teóricamente existentes, solo hay en realidad 44 más una ménsula perteneciente a OSN, ubicada en la Av. Rivadavia N° 22732. Esta situación se encuentra reflejada en los planos N° 2 “Red Teórica Antigua” y N° 3 “Red Antigua Existente”, en este último solo se graficaron las ménsulas existentes al momento del relevamiento (septiembre de 2005).

### ***Distribución de nuevos Puntos Fijos***

Siguiendo un criterio similar al utilizado por la Dirección de Geodesia, se hizo una distribución de nuevos puntos con el fin de cubrir en forma homogénea toda la superficie del partido. La premisa básica es que desde cualquier punto que se pretenda acotar no se tenga que recorrer una distancia superior a 500 metros. Otro punto a tener en cuenta al momento de la materialización de la red será la selección de los inmuebles sobre cuyos frentes serán colocados los nuevos puntos, en este sentido se debería extremar los cuidados en la selección para lograr la mayor perdurabilidad posible en el tiempo. En el Plano N° 4, se presenta una propuesta de densificación de la Red Existente.





En total se prevé la colocación de 133 ménsulas nuevas, que sumadas a las 45 existentes (44 de la Dirección de Geodesia y 1 de la ex Obras Sanitaria de la Nación) harían un total de 178.

Una vez ubicados los nuevos emplazamientos se diseñaron los itinerarios poligonales para la tarea de nivelación. En este punto cabe aclarar que el diseño de polígonos propuesto (Plano nº 5) es solo uno de los tantos posibles. Se han previstos 27 polígonos, numerados en romanos integrado por 211 tramos de nivelación identificados con números arábigos.

### ***Construcción de los Puntos Fijos***

Se diseñó una ménsula con la inscripción **Municipalidad de Ituzaingo, P:F: Altimétrico.**

En el Anexo III, se presenta un plano con las características y medidas de la ménsula diseñada. Estas referencias se construirían en bronce, con un baño que no permita distinguir a simple vista el material de que está hecha y tendrían un peso de algo mas de 400 gramos. En la cara posterior tendría dos orificios de 6 mm de diámetro con rosca, de tal manera que se pueda enroscar allí un bulón de dicho diámetro y 10 cm. de largo (o bien un trozo de 10 cm. de varilla roscada) para permitir su fijación en la fachada seleccionada.



### ***Nivelación de la Red***

La nivelación de la red se hará siguiendo los itinerarios poligonales previstos, mediante nivelación geométrica. Cada tramo será nivelado de ida y vuelta y se establece como tolerancia  $10mm\sqrt{L(Km)}$  entre ménsulas sucesivas, donde L es la longitud del tramo en kilómetros.

Se estima un total aproximado de 180 km. de nivelación de ida y vuelta, o sea 360 km. totales de nivelación.

Se prevé la utilización de un nivel de un nivel de 32x aumentos con una desviación típica de 0.7 mm. para 1 km. de doble nivelación, la utilización de niveles esféricos para verticalización de las miras y la utilización de sapos o pié de mira, para el apoyo de las mismas en los puntos de paso.



## Calculo de la red

Se medirán en total 27 polígonos, que por efecto de los errores de medición la suma de los desniveles parciales no será cero en cada uno de ellos. Para que esto ocurra deberemos aplicar una corrección  $v_i$  a cada uno de los desniveles medidos. Los 27 polígonos de nuestro caso darán origen a 27 **ecuaciones de condición** linealmente independientes, coincidentes con los 27 polígonos continuos no superpuestos. En este caso dichos polígonos fueron numerados del I al XXVII (con números romanos).

### Para el polígono I tendremos

$$I \quad h_{203} + h_{204} + h_{205} + h_{206} + h_{207} + h_{208} + h_{209} + h_{210} + h_{173} + h_{174} + h_{175} + h_{195} + h_{196} + h_{197} + h_{198} + h_{199} + h_{200} = w_1 \text{ ó } 0$$

$$I \quad (h_{203} + v_{203}) + (h_{204} + v_{204}) + (h_{205} + v_{205}) + (h_{206} + v_{206}) + (h_{207} + v_{207}) + (h_{208} + v_{208}) + (h_{209} + v_{209}) + (h_{210} + v_{210}) + (h_{173} + v_{173}) + (h_{174} + v_{174}) + (h_{175} + v_{175}) + (h_{195} + v_{195}) + (h_{196} + v_{196}) + (h_{197} + v_{197}) + (h_{198} + v_{198}) + (h_{199} + v_{199}) + (h_{200} + v_{200}) = 0$$

Y así sucesivamente para cada uno de ellos.

### Ecuaciones de condición

$$I \quad v_{203} + v_{204} + v_{205} + v_{206} + v_{207} + v_{208} + v_{209} + v_{210} + v_{173} + v_{174} + v_{175} + v_{195} + v_{196} + v_{197} + v_{198} + v_{199} + v_{200} + w_1 = 0$$



$$\text{II} \quad V_{202} + V_{201} + V_{200} + V_{199} + V_{198} + V_{197} + V_{196} + V_{194} + V_{193} + V_{192} + \mathbf{w_2 = 0}$$

$$\text{III} \quad V_{191} + V_{192} + V_{193} + V_{194} + V_{195} + V_{176} + V_{190} + V_{189} + V_{188} + \mathbf{w_3 = 0}$$

$$\text{IV} \quad V_{186} + V_{187} + V_{188} + V_{189} + V_{190} + V_{177} + V_{178} + \mathbf{w_4 = 0}$$

$$\text{V} \quad V_{178} + V_{177} + V_{176} + V_{175} + V_{174} + V_{173} + V_{172} + V_{171} + V_{143} + V_{170} + V_{169} + V_{168} + V_{185} + \\ V_{184} + V_{183} + V_{182} + V_{181} + V_{179} + \mathbf{w_5 = 0}$$

$$\text{VI} \quad V_{181} + V_{182} + V_{183} + V_{184} + V_{185} + V_{167} + V_{166} + V_{165} + V_{180} + \mathbf{w_6 = 0}$$

$$\text{VII} \quad V_{163} + V_{164} + V_{165} + V_{166} + V_{167} + V_{168} + V_{169} + V_{170} + V_{144} + V_{145} + V_{146} + V_{147} + V_{148} + \\ V_{161} + V_{160} + V_{159} + V_{158} + V_{152} + \mathbf{w_7 = 0}$$

$$\text{VIII} \quad V_{157} + V_{158} + V_{159} + V_{160} + V_{161} + V_{149} + V_{151} + V_{152} + V_{153} + V_{154} + V_{156} + \mathbf{w_8 = 0}$$

$$\text{IX} \quad V_{154} + V_{153} + V_{152} + V_{151} + V_{150} + V_{133} + V_{132} + V_{131} + V_{130} + V_{129} + V_{155} + \mathbf{w_9 = 0}$$

$$\text{X} \quad V_{149} + V_{148} + V_{147} + V_{146} + V_{145} + V_{144} + V_{143} + V_{142} + V_{140} + V_{139} + V_{138} + V_{137} + V_{136} + \\ V_{135} + V_{134} + V_{150} + \mathbf{w_{10} = 0}$$

$$\text{XI} \quad V_{132} + V_{133} + V_{134} + V_{135} + V_{136} + V_{137} + V_{138} + V_{139} + V_{140} + V_{141} + V_{114} + V_{115} + V_{116} + \\ V_{117} + V_{118} + V_{119} + V_{120} + V_{121} + V_{123} + \mathbf{w_{11} = 0}$$

$$\text{XII} \quad V_{125} + V_{126} + V_{127} + V_{128} + V_{129} + V_{130} + V_{124} + V_{98} + V_{97} + \mathbf{w_{12} = 0}$$

$$\text{XIII} \quad V_{97} + V_{98} + V_{99} + V_{100} + V_{88} + V_{89} + V_{93} + V_{94} + V_{95} + V_{96} + \mathbf{w_{13} = 0}$$



$$\text{XIV} \quad V_{124} + V_{123} + V_{122} + V_{86} + V_{85} + V_{66} + V_{65} + V_{87} + V_{101} + V_{100} + V_{99} + \mathbf{w_{14}} = \mathbf{0}$$

$$\text{XV} \quad V_{121} + V_{120} + V_{119} + V_{118} + V_{117} + V_{116} + V_{115} + V_{114} + V_{113} + V_{111} + V_{110} + V_{109} + V_{108} + V_{107} + V_{106} + V_{105} + V_{104} + V_{103} + V_{102} + V_{122} + \mathbf{w_{15}} = \mathbf{0}$$

$$\text{XVI} \quad V_{102} + V_{103} + V_{104} + V_{105} + V_{106} + V_{107} + V_{108} + V_{109} + V_{110} + V_{111} + V_{112} + V_{77} + V_{78} + V_{79} + V_{80} + V_{81} + V_{82} + V_{83} + V_{84} + V_{85} + V_{86} + \mathbf{w_{16}} = \mathbf{0}$$

$$\text{XVII} \quad V_{91} + V_{90} + V_{89} + V_{88} + V_{87} + V_{64} + V_{63} + V_{62} + V_{61} + V_{92} + \mathbf{w_{17}} = \mathbf{0}$$

$$\text{XVIII} \quad V_{61} + V_{62} + V_{63} + V_{64} + V_{65} + V_{54} + V_{55} + V_{56} + V_{57} + V_{58} + V_{60} + \mathbf{w_{18}} = \mathbf{0}$$

$$\text{XIX} \quad V_{84} + V_{83} + V_{82} + V_{81} + V_{80} + V_{79} + V_{78} + V_{77} + V_{76} + V_{75} + V_{74} + V_{73} + V_{46} + V_{47} + V_{72} + V_{71} + V_{70} + V_{69} + V_{68} + V_{67} + \mathbf{w_{19}} = \mathbf{0}$$

$$\text{XX} \quad V_{68} + V_{69} + V_{70} + V_{71} + V_{72} + V_{48} + V_{49} + V_{50} + V_{51} + V_{52} + \mathbf{w_{20}} = \mathbf{0}$$

$$\text{XXI} \quad V_{51} + V_{50} + V_{49} + V_{48} + V_{47} + V_{46} + V_{45} + V_{44} + V_{43} + V_{42} + V_{211} + \mathbf{w_{21}} = \mathbf{0}$$

$$\text{XXII} \quad V_{58} + V_{57} + V_{56} + V_{55} + V_{54} + V_{53} + V_{39} + V_{38} + V_{37} + V_{36} + V_{35} + V_{34} + V_{59} + \mathbf{w_{22}} = \mathbf{0}$$

$$\text{XXIII} \quad V_{34} + V_{35} + V_{36} + V_{37} + V_{38} + V_{39} + V_{40} + V_{41} + V_{25} + V_{26} + V_{27} + V_{28} + V_{29} + V_{30} + V_{31} + V_{33} + \mathbf{w_{23}} = \mathbf{0}$$

$$\text{XXIV} \quad V_{31} + V_{30} + V_{29} + V_{28} + V_{27} + V_{26} + V_{25} + V_{24} + V_{22} + V_{23} + V_{16} + V_{15} + V_{14} + V_{13} + V_{12} + V_{32} + \mathbf{w_{24}} = \mathbf{0}$$



$$\mathbf{XXV} \quad V_{12} + V_{13} + V_{14} + V_{15} + V_{16} + V_{17} + V_{18} + V_1 + V_2 + V_3 + V_4 + V_5 + V_6 + V_{13} + V_7 + V_8 + V_9 + V_{10} + V_{11} + \mathbf{w_{25}} = \mathbf{0}$$

$$\mathbf{XXVI} \quad V_{67} + V_{52} + V_{211} + V_{41} + V_{40} + V_{53} + V_{66} + \mathbf{w_{26}} = \mathbf{0}$$

$$\mathbf{XXVII} \quad V_{23} + V_{22} + V_{21} + V_{20} + V_{19} + V_{18} + V_{17} + \mathbf{w_{27}} = \mathbf{0}$$

### Cálculo de los coeficientes de las ecuaciones normales

Con el objeto de facilitar el cálculo de los signos de los coeficientes de las ecuaciones normales, se construyó la TABLA 1 se presenta a continuación. En este caso tomamos un sentido horario para el recorrido de los polígonos.



| Polígonos            | V <sub>1</sub> | V <sub>2</sub> | V <sub>3</sub> | V <sub>4</sub> | V <sub>5</sub> | V <sub>6</sub> | V <sub>7</sub> | V <sub>8</sub> | V <sub>9</sub> | V <sub>10</sub> | V <sub>11</sub> | V <sub>12</sub> | V <sub>13</sub> | V <sub>14</sub> | V <sub>15</sub> | V <sub>16</sub> | V <sub>17</sub> | V <sub>18</sub> | V <sub>19</sub> | V <sub>20</sub> |    |
|----------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----|
| I. a                 |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| II. b                |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| III. c               |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| IV. ch               |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| V. d                 |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| VI. e                |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| VII. f               |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| VIII. g              |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| IX. h                |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| X. i                 |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| XI. j                |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| XII. K               |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| XIII. l              |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| XIV. m               |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| XV. n                |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| XVI. ñ               |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| XVII. o              |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| XVIII. p             |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| XIX. q               |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| XX. r                |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| XXI. s               |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| XXII. t              |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| XXIII. u             |                |                |                |                |                |                |                |                |                |                 |                 | +1              | +1              | +1              | +1              | +1              |                 |                 |                 |                 |    |
| XXIV. x              |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| XXV. y               |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| XXVI. z              |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |
| XXVII. Z#            |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 | -1              | -1              | +1              | +1 |
| 1/p = d <sub>i</sub> | d <sub>1</sub> | d <sub>2</sub> | d <sub>3</sub> | d <sub>4</sub> | d <sub>5</sub> | d <sub>6</sub> | d <sub>7</sub> | d <sub>8</sub> | d <sub>9</sub> | d <sub>10</sub> | d <sub>11</sub> | d <sub>12</sub> | d <sub>13</sub> | d <sub>14</sub> | d <sub>15</sub> | d <sub>16</sub> | d <sub>17</sub> | d <sub>18</sub> | d <sub>19</sub> | d <sub>20</sub> |    |

TABLA 1: Cálculo de los coeficientes de las ecuaciones normales



| Polígonos            | V <sub>21</sub> | V <sub>22</sub> | V <sub>23</sub> | V <sub>24</sub> | V <sub>25</sub> | V <sub>26</sub> | V <sub>27</sub> | V <sub>28</sub> | V <sub>29</sub> | V <sub>30</sub> | V <sub>31</sub> | V <sub>32</sub> | V <sub>33</sub> | V <sub>34</sub> | V <sub>35</sub> | V <sub>36</sub> | V <sub>37</sub> | V <sub>38</sub> | V <sub>39</sub> | V <sub>40</sub> |
|----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| I. a                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| II. b                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| III. c               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| IV. ch               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| V. d                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| VI. e                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| VII. f               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| VIII. g              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| IX. h                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| X. i                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XI. j                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XII. K               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XIII. l              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XIV. m               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XV. n                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XVI. ñ               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XVII. o              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XVIII. p             |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XIX. q               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XX. r                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XXI. s               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XXII. t              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | +1              | +1              | +1              | +1              | +1              | +1              |                 |
| XXIII. u             |                 |                 |                 |                 | +1              | +1              | +1              | +1              | +1              | +1              | +1              |                 | +1              | -1              | -1              | -1              | -1              | -1              | -1              | -1              |
| XXIV. x              |                 | +1              | +1              | +1              | -1              | -1              | -1              | -1              | -1              | -1              | -1              | +1              |                 |                 |                 |                 |                 |                 |                 |                 |
| XXV. y               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XXVI. z              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | +1              |
| XXVII. Z#            | +1              | -1              | -1              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| 1/p = d <sub>i</sub> | d <sub>21</sub> | d <sub>22</sub> | d <sub>23</sub> | d <sub>24</sub> | d <sub>25</sub> | d <sub>26</sub> | d <sub>27</sub> | d <sub>28</sub> | d <sub>29</sub> | d <sub>30</sub> | d <sub>31</sub> | d <sub>32</sub> | d <sub>33</sub> | d <sub>34</sub> | d <sub>35</sub> | d <sub>36</sub> | d <sub>37</sub> | d <sub>38</sub> | d <sub>39</sub> | d <sub>40</sub> |

TABLA 1: Cálculo de los coeficientes de las ecuaciones normales





| Polígonos            | V <sub>41</sub> | V <sub>42</sub> | V <sub>43</sub> | V <sub>44</sub> | V <sub>45</sub> | V <sub>46</sub> | V <sub>47</sub> | V <sub>48</sub> | V <sub>49</sub> | V <sub>50</sub> | V <sub>51</sub> | V <sub>52</sub> | V <sub>53</sub> | V <sub>54</sub> | V <sub>55</sub> | V <sub>56</sub> | V <sub>57</sub> | V <sub>58</sub> | V <sub>59</sub> | V <sub>60</sub> |
|----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| I. a                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| II. b                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| III. c               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| IV. ch               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| V. d                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| VI. e                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| VII. f               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| VIII. g              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| IX. h                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| X. i                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XI. j                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XII. K               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XIII. l              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XIV. m               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XV. n                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XVI. ñ               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XVII. o              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XVIII. p             |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | +1              | +1              | +1              | +1              | +1              |                 | +1              |
| XIX. q               |                 |                 |                 |                 |                 | +1              | +1              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XX. r                |                 |                 |                 |                 |                 |                 |                 | +1              | +1              | +1              | +1              | +1              |                 |                 |                 |                 |                 |                 |                 |                 |
| XXI. s               |                 | +1              | +1              | +1              | +1              | -1              | -1              | -1              | -1              | -1              | -1              |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XXII. t              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | -1              | -1              | -1              | -1              | -1              | -1              | +1              |                 |
| XXIII. u             | -1              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XXIV. x              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XXV. y               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XXVI. z              | +1              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | -1              | +1              |                 |                 |                 |                 |                 |                 |                 |
| XXVII. Z#            |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| 1/p = d <sub>i</sub> | d <sub>41</sub> | d <sub>42</sub> | d <sub>43</sub> | d <sub>44</sub> | d <sub>45</sub> | d <sub>46</sub> | d <sub>47</sub> | d <sub>48</sub> | d <sub>49</sub> | d <sub>50</sub> | d <sub>51</sub> | d <sub>52</sub> | d <sub>53</sub> | d <sub>54</sub> | d <sub>55</sub> | d <sub>56</sub> | d <sub>57</sub> | d <sub>58</sub> | d <sub>59</sub> | d <sub>60</sub> |

TABLA 1: Cálculo de los coeficientes de las ecuaciones normales



| Polígonos            | V <sub>61</sub> | V <sub>62</sub> | V <sub>63</sub> | V <sub>64</sub> | V <sub>65</sub> | V <sub>66</sub> | V <sub>67</sub> | V <sub>68</sub> | V <sub>69</sub> | V <sub>70</sub> | V <sub>71</sub> | V <sub>72</sub> | V <sub>73</sub> | V <sub>74</sub> | V <sub>75</sub> | V <sub>76</sub> | V <sub>77</sub> | V <sub>78</sub> | V <sub>79</sub> | V <sub>80</sub> |
|----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| I. a                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| II. b                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| III. c               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| IV. ch               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| V. d                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| VI. e                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| VII. f               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| VIII. g              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| IX. h                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| X. i                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XI. j                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XII. K               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XIII. l              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XIV. m               |                 |                 |                 |                 | +1              | +1              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XV. n                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XVI. ñ               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | +1              | +1              | +1              | +1              |
| XVII. o              | +1              | +1              | +1              | +1              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XVIII. p             | -1              | -1              | -1              | -1              | -1              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XIX. q               |                 |                 |                 |                 |                 |                 | +1              | +1              | +1              | +1              | +1              | +1              | +1              | +1              | +1              | +1              | -1              | -1              | -1              | -1              |
| XX. r                |                 |                 |                 |                 |                 |                 |                 | -1              | -1              | -1              | -1              | -1              |                 |                 |                 |                 |                 |                 |                 |                 |
| XXI. s               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XXII. t              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XXIII. u             |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XXIV. x              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XXV. y               |                 |                 |                 |                 |                 | -1              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XXVI. z              |                 |                 |                 |                 |                 |                 | -1              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| XXVII. Z#            |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| 1/p = d <sub>i</sub> | d <sub>61</sub> | d <sub>62</sub> | d <sub>63</sub> | d <sub>64</sub> | d <sub>65</sub> | d <sub>66</sub> | d <sub>67</sub> | d <sub>68</sub> | d <sub>69</sub> | d <sub>70</sub> | d <sub>71</sub> | d <sub>72</sub> | d <sub>73</sub> | d <sub>74</sub> | d <sub>75</sub> | d <sub>76</sub> | d <sub>77</sub> | d <sub>78</sub> | d <sub>79</sub> | d <sub>80</sub> |

TABLA 1: Cálculo de los coeficientes de las ecuaciones normales



| Polígonos            | V <sub>81</sub> | V <sub>82</sub> | V <sub>83</sub> | V <sub>84</sub> | V <sub>85</sub> | V <sub>86</sub> | V <sub>87</sub> | V <sub>88</sub> | V <sub>89</sub> | V <sub>90</sub> | V <sub>91</sub> | V <sub>92</sub> | V <sub>93</sub> | V <sub>94</sub> | V <sub>95</sub> | V <sub>96</sub> | V <sub>97</sub> | V <sub>98</sub> | V <sub>99</sub> | V <sub>100</sub> |
|----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|
| I. a                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| II. b                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| III. c               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| IV. ch               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| V. d                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| VI. e                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| VII. f               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| VIII. g              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| IX. h                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| X. i                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| XI. j                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| XII. K               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | +1              | +1              |                 |                  |
| XIII. l              |                 |                 |                 |                 |                 |                 |                 | +1              | +1              |                 |                 |                 | +1              | +1              | +1              | +1              | -1              | -1              | +1              | +1               |
| XIV. m               |                 |                 |                 |                 | +1              | +1              | +1              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | -1              | -1               |
| XV. n                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| XVI. ñ               | +1              | +1              | +1              | +1              | -1              | -1              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| XVII. o              |                 |                 |                 |                 |                 |                 | -1              | -1              | -1              | +1              | +1              | +1              |                 |                 |                 |                 |                 |                 |                 |                  |
| XVIII. p             |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| XIX. q               | -1              | -1              | -1              | -1              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| XX. r                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| XXI. s               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| XXII. t              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| XXIII. u             |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| XXIV. x              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| XXV. y               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| XXVI. z              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| XXVII. Z#            |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |
| 1/p = d <sub>i</sub> | d <sub>81</sub> | d <sub>82</sub> | d <sub>83</sub> | d <sub>84</sub> | d <sub>85</sub> | d <sub>86</sub> | d <sub>87</sub> | d <sub>88</sub> | d <sub>89</sub> | d <sub>90</sub> | d <sub>91</sub> | d <sub>92</sub> | d <sub>93</sub> | d <sub>94</sub> | d <sub>95</sub> | d <sub>96</sub> | d <sub>97</sub> | d <sub>98</sub> | d <sub>99</sub> | d <sub>100</sub> |

TABLA 1: Cálculo de los coeficientes de las ecuaciones normales



| Polígonos            | V <sub>101</sub>       | V <sub>102</sub>       | V <sub>103</sub>       | V <sub>104</sub>       | V <sub>105</sub>       | V <sub>106</sub>       | V <sub>107</sub>            | V <sub>108</sub>       | V <sub>109</sub>       | V <sub>110</sub>       | V <sub>111</sub>       | V <sub>112</sub>       | V <sub>113</sub>       | V <sub>114</sub>       | V <sub>115</sub>       | V <sub>116</sub>       | V <sub>117</sub>       | V <sub>118</sub>       | V <sub>119</sub>       | V <sub>120</sub>       |
|----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-----------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| I. a                 |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| II. b                |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| III. c               |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| IV. h                |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| V. d                 |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| VI. e                |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| VII. f               |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| VIII. g              |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| IX. h                |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| X. i                 |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XI. j                |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        | +1                     | +1                     | +1                     | +1                     | +1                     | +1                     | +1                     |
| XII. K               |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XIII. l              | +1                     |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XIV. m               | -1                     |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XV. n                |                        | +1                     | +1                     | +1                     | +1                     | +1                     | +1                          | +1                     | +1                     | +1                     | +1                     |                        | +1                     | -1                     | -1                     | -1                     | -1                     | -1                     | -1                     | -1                     |
| XVI. ñ               |                        | -1                     | -1                     | -1                     | -1                     | -1                     | -1                          | -1                     | -1                     | -1                     | -1                     | +1                     |                        |                        |                        |                        |                        |                        |                        |                        |
| XVII. o              |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XVIII. p             |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XIX. q               |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XX. r                |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXI. s               |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXII. t              |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXIII. u             |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXIV. x              |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXV. y               |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXVI. z              |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXVII. Z#            |                        |                        |                        |                        |                        |                        |                             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| 1/p = d <sub>i</sub> | <b>d<sub>101</sub></b> | <b>d<sub>102</sub></b> | <b>d<sub>103</sub></b> | <b>d<sub>104</sub></b> | <b>d<sub>105</sub></b> | <b>d<sub>106</sub></b> | <b>d<sub>107</sub></b><br>+ | <b>d<sub>108</sub></b> | <b>d<sub>109</sub></b> | <b>d<sub>110</sub></b> | <b>d<sub>111</sub></b> | <b>d<sub>112</sub></b> | <b>d<sub>113</sub></b> | <b>d<sub>114</sub></b> | <b>d<sub>115</sub></b> | <b>d<sub>116</sub></b> | <b>d<sub>117</sub></b> | <b>d<sub>118</sub></b> | <b>d<sub>119</sub></b> | <b>d<sub>120</sub></b> |

**TABLA 1: Cálculo de los coeficientes de las ecuaciones normales**



| Polígonos            | V <sub>121</sub> | V <sub>122</sub> | V <sub>123</sub> | V <sub>124</sub> | V <sub>125</sub> | V <sub>126</sub> | V <sub>127</sub> | V <sub>128</sub> | V <sub>129</sub> | V <sub>130</sub> | V <sub>131</sub> | V <sub>132</sub> | V <sub>133</sub> | V <sub>134</sub> | V <sub>135</sub> | V <sub>136</sub> | V <sub>137</sub> | V <sub>138</sub> | V <sub>139</sub> | V <sub>140</sub> |
|----------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| I. a                 |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| II. b                |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| III. c               |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| IV. h                |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| V. d                 |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| VI. e                |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| VII. f               |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| VIII. g              |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| IX. h                |                  |                  |                  |                  |                  |                  |                  |                  | +1               | +1               | +1               | +1               | +1               |                  |                  |                  |                  |                  |                  |                  |
| X. i                 |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  | +1               | +1               | +1               | +1               | +1               | +1               | +1               |
| XI. j                | +1               |                  | +1               |                  |                  |                  |                  |                  |                  |                  |                  | -1               | -1               | -1               | -1               | -1               | -1               | -1               | -1               | -1               |
| XII. k               |                  |                  |                  | +1               | +1               | +1               | +1               | +1               | -1               | -1               | -1               |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| XIII. l              |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| XIV. m               |                  | +1               | -1               | -1               |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| XV. n                | -1               | -1               |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| XVI. ñ               |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| XVII. o              |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| XVIII. p             |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| XIX. q               |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| XX. r                |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| XXI. s               |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| XXII. t              |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| XXIII. u             |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| XXIV. x              |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| XXV. y               |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| XXVI. z              |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| XXVII. Z#            |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| 1/p = d <sub>i</sub> | d <sub>121</sub> | d <sub>122</sub> | d <sub>123</sub> | d <sub>124</sub> | d <sub>125</sub> | d <sub>126</sub> | d <sub>127</sub> | d <sub>128</sub> | d <sub>129</sub> | d <sub>130</sub> | d <sub>131</sub> | d <sub>132</sub> | d <sub>133</sub> | d <sub>134</sub> | d <sub>135</sub> | d <sub>136</sub> | d <sub>137</sub> | d <sub>138</sub> | d <sub>139</sub> | d <sub>140</sub> |

TABLA 1: Cálculo de los coeficientes de las ecuaciones normales



| Polígonos            | V <sub>141</sub>       | V <sub>142</sub>       | V <sub>143</sub>       | V <sub>144</sub>       | V <sub>145</sub>       | V <sub>146</sub>       | V <sub>147</sub>       | V <sub>148</sub>       | V <sub>149</sub>       | V <sub>150</sub>       | V <sub>151</sub>       | V <sub>152</sub>       | V <sub>153</sub>       | V <sub>154</sub>       | V <sub>155</sub>       | V <sub>156</sub>       | V <sub>157</sub>       | V <sub>158</sub>       | V <sub>159</sub>       | V <sub>160</sub>       |
|----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| I. a                 |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| II. b                |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| III. c               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| IV. h                |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| V. d                 |                        |                        | +1                     |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| VI. e                |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| VII. f               |                        |                        |                        | +1                     | +1                     | +1                     | +1                     | +1                     |                        |                        |                        |                        |                        |                        |                        |                        |                        | +1                     | +1                     | +1                     |
| VIII. g              |                        |                        |                        |                        |                        |                        |                        |                        | +1                     |                        | +1                     | +1                     | +1                     | +1                     |                        | +1                     | +1                     | -1                     | -1                     | -1                     |
| IX. h                |                        |                        |                        |                        |                        |                        |                        |                        |                        | +1                     | -1                     | -1                     | -1                     | -1                     | +1                     |                        |                        |                        |                        |                        |
| X. i                 |                        | +1                     | -1                     | -1                     | -1                     | -1                     | -1                     | -1                     | -1                     | -1                     |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XI. j                | +1                     |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XII. K               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XIII. l              |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XIV. m               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XV. n                |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XVI. ñ               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XVII. o              |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XVIII. p             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XIX. q               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XX. r                |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXI. s               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXII. t              |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXIII. u             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXIV. x              |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXV. y               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXVI. z              |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXVII. Z#            |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| 1/p = d <sub>i</sub> | <b>d<sub>141</sub></b> | <b>d<sub>142</sub></b> | <b>d<sub>143</sub></b> | <b>d<sub>144</sub></b> | <b>d<sub>145</sub></b> | <b>d<sub>146</sub></b> | <b>d<sub>147</sub></b> | <b>d<sub>148</sub></b> | <b>d<sub>149</sub></b> | <b>d<sub>150</sub></b> | <b>d<sub>151</sub></b> | <b>d<sub>152</sub></b> | <b>d<sub>153</sub></b> | <b>d<sub>154</sub></b> | <b>d<sub>155</sub></b> | <b>d<sub>156</sub></b> | <b>d<sub>157</sub></b> | <b>d<sub>158</sub></b> | <b>d<sub>159</sub></b> | <b>d<sub>160</sub></b> |

TABLA 1: Cálculo de los coeficientes de las ecuaciones normales



| Polígonos            | V <sub>161</sub>       | V <sub>162</sub>       | V <sub>163</sub>       | V <sub>164</sub>       | V <sub>165</sub>       | V <sub>166</sub>       | V <sub>167</sub>       | V <sub>168</sub>       | V <sub>169</sub>       | V <sub>170</sub>       | V <sub>171</sub>       | V <sub>172</sub>       | V <sub>173</sub>       | V <sub>174</sub>       | V <sub>175</sub>       | V <sub>176</sub>       | V <sub>177</sub>       | V <sub>178</sub>       | V <sub>179</sub>       | V <sub>180</sub>       |
|----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| I. a                 |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | +1                     | +1                     | +1                     |                        |                        |                        |                        |                        |
| II. b                |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| III. c               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | +1                     |                        |                        |                        |                        |
| IV. h                |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | +1                     | +1                     |                        |                        |
| V. d                 |                        |                        |                        |                        |                        |                        |                        | +1                     | +1                     | +1                     | +1                     | +1                     | -1                     | -1                     | -1                     | -1                     | -1                     | -1                     | +1                     |                        |
| VI. e                |                        |                        |                        |                        | +1                     | +1                     | +1                     |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | +1                     |
| VII. f               | +1                     | +1                     |                        |                        | -1                     | -1                     | -1                     | -1                     | -1                     | -1                     |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| VIII. g              | -1                     |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| IX. h                |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| X. i                 |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XI. j                |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XII. K               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XIII. l              |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XIV. m               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XV. n                |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XVI. ñ               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XVII. o              |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XVIII. p             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XIX. q               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XX. r                |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXI. s               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXII. t              |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXIII. u             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXIV. x              |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXV. y               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXVI. z              |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXVII. Z#            |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| 1/p = d <sub>i</sub> | <b>d<sub>161</sub></b> | <b>d<sub>162</sub></b> | <b>d<sub>163</sub></b> | <b>d<sub>164</sub></b> | <b>d<sub>165</sub></b> | <b>d<sub>166</sub></b> | <b>d<sub>167</sub></b> | <b>d<sub>168</sub></b> | <b>d<sub>169</sub></b> | <b>d<sub>170</sub></b> | <b>d<sub>171</sub></b> | <b>d<sub>172</sub></b> | <b>d<sub>173</sub></b> | <b>d<sub>174</sub></b> | <b>d<sub>175</sub></b> | <b>d<sub>176</sub></b> | <b>d<sub>177</sub></b> | <b>d<sub>178</sub></b> | <b>d<sub>179</sub></b> | <b>d<sub>180</sub></b> |

TABLA 1: Cálculo de los coeficientes de las ecuaciones normales



| Polígonos            | V <sub>181</sub>       | V <sub>182</sub>       | V <sub>183</sub>       | V <sub>184</sub>       | V <sub>185</sub>       | V <sub>186</sub>       | V <sub>187</sub>       | V <sub>188</sub>       | V <sub>189</sub>       | V <sub>190</sub>       | V <sub>191</sub>       | V <sub>192</sub>       | V <sub>193</sub>       | V <sub>194</sub>       | V <sub>195</sub>       | V <sub>196</sub>       | V <sub>197</sub>       | V <sub>198</sub>       | V <sub>199</sub>       | V <sub>200</sub>       |
|----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| I. a                 |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | +1                     | +1                     | +1                     | +1                     | +1                     | +1                     |
| II. b                |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        | +1                     | +1                     | +1                     |                        | -1                     | -1                     | -1                     | -1                     | -1                     |
| III. c               |                        |                        |                        |                        |                        |                        |                        | +1                     | +1                     | +1                     | +1                     | -1                     | -1                     | -1                     | -1                     |                        |                        |                        |                        |                        |
| IV. h                |                        |                        |                        |                        |                        | +1                     | +1                     | -1                     | -1                     | -1                     |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| V. d                 | +1                     | +1                     | +1                     | +1                     | +1                     |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| VI. e                | -1                     | -1                     | -1                     | -1                     | -1                     |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| VII. f               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| VIII. g              |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| IX. h                |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| X. i                 |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XI. j                |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XII. K               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XIII. l              |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XIV. m               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XV. n                |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XVI. ñ               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XVII. o              |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XVIII. p             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XIX. q               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XX. r                |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXI. s               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXII. t              |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXIII. u             |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXIV. x              |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXV. y               |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXVI. z              |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| XXVII. Z#            |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| l/p = d <sub>i</sub> | <b>d<sub>181</sub></b> | <b>d<sub>182</sub></b> | <b>d<sub>183</sub></b> | <b>d<sub>184</sub></b> | <b>d<sub>185</sub></b> | <b>d<sub>186</sub></b> | <b>d<sub>187</sub></b> | <b>d<sub>188</sub></b> | <b>d<sub>189</sub></b> | <b>d<sub>190</sub></b> | <b>d<sub>191</sub></b> | <b>d<sub>192</sub></b> | <b>d<sub>193</sub></b> | <b>d<sub>194</sub></b> | <b>d<sub>195</sub></b> | <b>d<sub>196</sub></b> | <b>d<sub>197</sub></b> | <b>d<sub>198</sub></b> | <b>d<sub>199</sub></b> | <b>d<sub>200</sub></b> |

TABLA 1: Cálculo de los coeficientes de las ecuaciones normales





| Polígonos            | V <sub>201</sub> | V <sub>202</sub> | V <sub>203</sub> | V <sub>204</sub> | V <sub>205</sub> | V <sub>206</sub> | V <sub>207</sub> | V <sub>208</sub> | V <sub>209</sub> | V <sub>210</sub> | V <sub>211</sub> |  |  |  |  |  |  |  |  |
|----------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|--|--|--|--|--|--|--|--|
| I. a                 |                  |                  | +1               | +1               | +1               | +1               | +1               | +1               | +1               | +1               |                  |  |  |  |  |  |  |  |  |
| II. b                | +1               | +1               |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| III. c               |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| IV. h                |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| V. d                 |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| VI. e                |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| VII. f               |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| VIII. g              |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| IX. h                |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| X. i                 |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| XI. j                |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| XII. K               |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| XIII. l              |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| XIV. m               |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| XV. n                |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| XVI. ñ               |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| XVII. o              |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| XVIII. p             |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| XIX. q               |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| XX. r                |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| XXI. s               |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| XXII. t              |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| XXIII. u             |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| XXIV. x              |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| XXV. y               |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| XXVI. z              |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| XXVII. Z#            |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |  |  |  |  |  |  |  |
| 1/p = d <sub>i</sub> | d <sub>201</sub> | d <sub>202</sub> | d <sub>203</sub> | d <sub>204</sub> | d <sub>205</sub> | d <sub>206</sub> | d <sub>207</sub> | d <sub>208</sub> | d <sub>209</sub> | d <sub>210</sub> | d <sub>211</sub> |  |  |  |  |  |  |  |  |

TABLA 1: Cálculo de los coeficientes de las ecuaciones normales



## ***Ecuaciones normales***

$$[a.a/p].k_1+[a.b/p].k_2+[a.c/p].k_3+[a.ch/p].k_4+[a.d/p].k_5+[a.e/p].k_6+[a.f/p].k_7+[a.g/p].k_8+[a.h/p].k_9+[a.i/p].k_{10}+[a.j/p].k_{11}+[a.k/p].k_{12}+[a.l/p].k_{13}+[a.m/p].k_{14}+[a.n/p].k_{15}+[a.ñ/p].k_{16}+[a.o/p].k_{17}+[a.p/p].k_{18}+[a.q/p].k_{19}+[a.r/p].k_{20}+[a.s/p].k_{21}+[a.t/p].k_{22}+[a.u/p].k_{23}+[a.x/p].k_{24}+[a.y/p].k_{25}+[a.z/p].k_{26} + a.Z\#/p].k_{27}+ \mathbf{w}_1 = \mathbf{0}$$

$$[b.a/p].k_1+[b.b/p].k_2+[b.c/p].k_3+[b.ch/p].k_4+[b.d/p].k_5+[b.e/p].k_6+[b.f/p].k_7+[b.g/p].k_8+[b.h/p].k_9+[b.i/p].k_{10}+[b.j/p].k_{11}+[b.k/p].k_{12}+[b.l/p].k_{13}+[b.m/p].k_{14}+[b.n/p].k_{15}+[b.ñ/p].k_{16}+[b.o/p].k_{17}+[b.p/p].k_{18}+[b.q/p].k_{19}+[b.r/p].k_{20}+[b.s/p].k_{21}+[b.t/p].k_{22}+[b.u/p].k_{23}+[b.x/p].k_{24}+[b.y/p].k_{25}+[b.z/p].k_{26} + [b.Z\#/p].k_{27}+ \mathbf{w}_2 = \mathbf{0}$$

$$[c.a/p].k_1+[c.b/p].k_2+[c.c/p].k_3+[c.ch/p].k_4+[c.d/p].k_5+[c.e/p].k_6+[c.f/p].k_7+[c.g/p].k_8+[c.h/p].k_9+[c.i/p].k_{10}+[c.j/p].k_{11}+[c.k/p].k_{12}+[c.l/p].k_{13}+[c.m/p].k_{14}+[c.n/p].k_{15}+[c.ñ/p].k_{16}+[c.o/p].k_{17}+[c.p/p].k_{18}+[c.q/p].k_{19}+[c.r/p].k_{20}+[c.s/p].k_{21}+[c.t/p].k_{22}+[c.u/p].k_{23}+[c.x/p].k_{24}+[c.y/p].k_{25}+[c.z/p].k_{26} + [c.Z\#/p].k_{27}+ \mathbf{w}_3 = \mathbf{0}$$

$$[ch.a/p].k_1+[ch.b/p].k_2+[ch.c/p].k_3+[ch.ch/p].k_4+[ch.d/p].k_5+[ch.e/p].k_6+[ch.f/p].k_7+[ch.g/p].k_8+[ch.h/p].k_9+[ch.i/p].k_{10}+[ch.j/p].k_{11}+[ch.k/p].k_{12}+[ch.l/p].k_{13}+[ch.m/p].k_{14}+[ch.n/p].k_{15}+[ch.ñ/p].k_{16}+[ch.o/p].k_{17}+[ch.p/p].k_{18}+[ch.q/p].k_{19}+[ch.r/p].k_{20}+[ch.s/p].k_{21}+[ch.t/p].k_{22}+[ch.u/p].k_{23}+[ch.x/p].k_{24}+[ch.y/p].k_{25}+[ch.z/p].k_{26} + [ch.Z\#/p].k_{27}+ \mathbf{w}_4 = \mathbf{0}$$

$$[d.a/p].k_1+[d.b/p].k_2+[d.c/p].k_3+[d.ch/p].k_4+[d.d/p].k_5+[d.e/p].k_6+[d.f/p].k_7+[d.g/p].k_8+[d.h/p].k_9+[d.i/p].k_{10}+[d.j/p].k_{11}+[d.k/p].k_{12}+[d.l/p].k_{13}+[d.m/p].k_{14}+[d.n/p].k_{15}+[d.ñ/p].k_{16}+[d.o/p].k_{17}+[d.p/p].k_{18}+[d.q/p].k_{19}+[d.r/p].k_{20}+[d.s/p].k_{21}+[d.t/p].k_{22}+[d.u/p].k_{23}+[d.x/p].k_{24}+[d.y/p].k_{25}+[d.z/p].k_{26} + [d.Z\#/p].k_{27}+ \mathbf{w}_5 = \mathbf{0}$$



$$].k_{18}+[d.q/p].k_{19}+[d.r/p].k_{20}+[d.s/p].k_{21}+[d.t/p].k_{22}+[d.u/p].k_{23}+[d.x/p].k_{24}+[d.y/p].k_{25}+[d.z/p].k_{26} \\ +[d.Z\#/p].k_{27}+ \mathbf{w}_5 = \mathbf{0}$$

$$[e.a/p].k_1+[e.b/p].k_2+[e.c/p].k_3+[e.ch/p].k_4+[e.d/p].k_5+[e.e/p].k_6+[e.f/p].k_7+[e.g/p].k_8+[e.h/p].k_9+ \\ [e.i/p].k_{10}+[e.j/p].k_{11}+[e.k/p].k_{12}+[e.l/p].k_{13}+[e.m/p].k_{14}+[e.n/p].k_{15}+[e.ñ/p].k_{16}+[e.o/p].k_{17}+[e.p/p] \\ ].k_{18}+[e.q/p].k_{19}+[e.r/p].k_{20}+[e.s/p].k_{21}+[e.t/p].k_{22}+[e.u/p].k_{23}+[e.x/p].k_{24}+[e.y/p].k_{25}+[e.z/p].k_{26} \\ +[e.Z\#/p].k_{27}+ \mathbf{w}_6 = \mathbf{0}$$

$$[f.a/p].k_1+[f.b/p].k_2+[f.c/p].k_3+[f.ch/p].k_4+[f.d/p].k_5+[f.e/p].k_6+[f.f/p].k_7+[f.g/p].k_8+[f.h/p].k_9+[f.i/p]. \\ k_{10}+[f.j/p].k_{11}+[f.k/p].k_{12}+[f.l/p].k_{13}+[f.m/p].k_{14}+[f.n/p].k_{15}+[f.ñ/p].k_{16}+[f.o/p].k_{17}+[f.p/p].k_{18}+[f.q/p] \\ .k_{19}+[f.r/p].k_{20}+[f.s/p].k_{21}+[f.t/p].k_{22}+[f.u/p].k_{23}+[f.x/p].k_{24}+[f.y/p].k_{25}+[f.z/p].k_{26} +[f.Z\#/p].k_{27}+ \mathbf{w}_7 \\ = \mathbf{0}$$

$$[g.a/p].k_1+[g.b/p].k_2+[g.c/p].k_3+[g.ch/p].k_4+[g.d/p].k_5+[g.e/p].k_6+[g.f/p].k_7+[g.g/p].k_8+[g.h/p].k_9+ \\ [g.i/p].k_{10}+[g.j/p].k_{11}+[g.k/p].k_{12}+[g.l/p].k_{13}+[g.m/p].k_{14}+[g.n/p].k_{15}+[g.ñ/p].k_{16}+[g.o/p].k_{17}+[g.p/p] \\ ].k_{18}+[g.q/p].k_{19}+[g.r/p].k_{20}+[g.s/p].k_{21}+[g.t/p].k_{22}+[g.u/p].k_{23}+[g.x/p].k_{24}+[g.y/p].k_{25}+[g.z/p].k_{26} \\ +[g.Z\#/p].k_{27}+ \mathbf{w}_8 = \mathbf{0}$$

$$[h.a/p].k_1+[h.b/p].k_2+[h.c/p].k_3+[h.ch/p].k_4+[h.d/p].k_5+[h.e/p].k_6+[h.f/p].k_7+[h.g/p].k_8+[h.h/p].k_9+ \\ [h.i/p].k_{10}+[h.j/p].k_{11}+[h.k/p].k_{12}+[h.l/p].k_{13}+[h.m/p].k_{14}+[h.n/p].k_{15}+[h.ñ/p].k_{16}+[h.o/p].k_{17}+[h.p/p] \\ ].k_{18}+[h.q/p].k_{19}+[h.r/p].k_{20}+[h.s/p].k_{21}+[h.t/p].k_{22}+[h.u/p].k_{23}+[h.x/p].k_{24}+[h.y/p].k_{25}+[h.z/p].k_{26} \\ +[h.Z\#/p].k_{27}+ \mathbf{w}_9 = \mathbf{0}$$

$$[i.a/p].k_1+[i.b/p].k_2+[i.c/p].k_3+[i.ch/p].k_4+[i.d/p].k_5+[i.e/p].k_6+[i.f/p].k_7+[i.g/p].k_8+[i.h/p].k_9+[i.i/p].k_{10}+ \\ [i.j/p].k_{11}+[i.k/p].k_{12}+[i.l/p].k_{13}+[i.m/p].k_{14}+[i.n/p].k_{15}+[i.ñ/p].k_{16}+[i.o/p].k_{17}+[i.p/p].k_{18}+[i.q/p].k_{19}+ \\ [i.r/p].k_{20}+[i.s/p].k_{21}+[i.t/p].k_{22}+[i.u/p].k_{23}+[i.x/p].k_{24}+[i.y/p].k_{25}+[i.z/p].k_{26} +[i.Z\#/p].k_{27}+ \mathbf{w}_{10} \\ = \mathbf{0}$$



$${}_{19}+[i.r/p].k_{20}+[i.s/p].k_{21}+[i.t/p].k_{22}+[i.u/p].k_{23}+[i.x/p].k_{24}+[i.y/p].k_{25}+[i.z/p].k_{26} +[i.Z\#/p].k_{27}+ \mathbf{w}_{10} = \mathbf{0}$$

$$[j.a/p].k_1+[j.b/p].k_2+[j.c/p].k_3+[j.ch/p].k_4+[j.d/p].k_5+[j.e/p].k_6+[j.f/p].k_7+[j.g/p].k_8+[j.h/p].k_9+[j.i/p].k_{10}+[j.j/p].k_{11}+[j.k/p].k_{12}+[j.l/p].k_{13}+[j.m/p].k_{14}+[j.n/p].k_{15}+[j.ñ/p].k_{16}+[j.o/p].k_{17}+[j.p/p].k_{18}+[j.q/p].k_{19}+[j.r/p].k_{20}+[j.s/p].k_{21}+[j.t/p].k_{22}+[j.u/p].k_{23}+[j.x/p].k_{24}+[j.y/p].k_{25}+[j.z/p].k_{26} +[j.Z\#/p].k_{27}+ \mathbf{w}_{11} = \mathbf{0}$$

$$[K.a/p].k_1+[K.b/p].k_2+[K.c/p].k_3+[K.ch/p].k_4+[K.d/p].k_5+[K.e/p].k_6+[K.f/p].k_7+[K.g/p].k_8+[K.h/p].k_9+[K.i/p].k_{10}+[K.K/p].k_{11}+[K.k/p].k_{12}+[K.l/p].k_{13}+[K.m/p].k_{14}+[K.n/p].k_{15}+[K.ñ/p].k_{16}+[K.o/p].k_{17}+[K.p/p].k_{18}+[K.q/p].k_{19}+[K.r/p].k_{20}+[K.s/p].k_{21}+[K.t/p].k_{22}+[K.u/p].k_{23}+[K.x/p].k_{24}+[K.y/p].k_{25}+[K.z/p].k_{26}+[K.Z\#/p].k_{27} + \mathbf{w}_{12} = \mathbf{0}$$

$$[l.a/p].k_1+[l.b/p].k_2+[l.c/p].k_3+[l.ch/p].k_4+[l.d/p].k_5+[l.e/p].k_6+[l.f/p].k_7+[l.g/p].k_8+[l.h/p].k_9+[l.i/p].k_{10}+[l.j/p].k_{11}+[l.k/p].k_{12}+[l.l/p].k_{13}+[l.m/p].k_{14}+[l.n/p].k_{15}+[l.ñ/p].k_{16}+[l.o/p].k_{17}+[l.p/p].k_{18}+[l.q/p].k_{19}+[l.r/p].k_{20}+[l.s/p].k_{21}+[l.t/p].k_{22}+[l.u/p].k_{23}+[l.x/p].k_{24}+[l.y/p].k_{25}+[l.z/p].k_{26} +[l.Z\#/p].k_{27}+ \mathbf{w}_{13} = \mathbf{0}$$

$$[m.a/p].k_1+[m.b/p].k_2+[m.c/p].k_3+[m.ch/p].k_4+[m.d/p].k_5+[m.e/p].k_6+[m.f/p].k_7+[m.g/p].k_8+[m.h/p].k_9+[m.i/p].k_{10}+[m.j/p].k_{11}+[m.k/p].k_{12}+[m.l/p].k_{13}+[m.m/p].k_{14}+[m.n/p].k_{15}+[m.ñ/p].k_{16}+[m.o/p].k_{17}+[m.p/p].k_{18}+[m.q/p].k_{19}+[m.r/p].k_{20}+[m.s/p].k_{21}+[m.t/p].k_{22}+[m.u/p].k_{23}+[m.x/p].k_{24}+[m.y/p].k_{25}+[m.z/p].k_{26} +[m.Z\#].k_{27} \mathbf{w}_{14} = \mathbf{0}$$



$[n.a/p].k_1+[n.b/p].k_2+[n.c/p].k_3+[n.ch/p].k_4+[n.d/p].k_5+[n.e/p].k_6+[n.f/p].k_7+[n.g/p].k_8+[n.h/p].k_9+$   
 $[n.i/p].k_{10}+[n.j/p].k_{11}+[n.k/p].k_{12}+[n.l/p].k_{13}+[n.m/p].k_{14}+[n.n/p].k_{15}+[n.ñ/p].k_{16}+[n.o/p].k_{17}+[n.p/p].$   
 $k_{18}+[n.q/p].k_{19}+[n.r/p].k_{20}+[n.s/p].k_{21}+[n.t/p].k_{22}+[n.u/p].k_{23}+[n.x/p].k_{24}+[n.y/p].k_{25}+[n.z/p].k_{26}$   
 $+ [n.Z\#/p].k_{27} + \mathbf{w}_{15} = \mathbf{0}$

$[\tilde{n}.a/p].k_1+[\tilde{n}.b/p].k_2+[\tilde{n}.c/p].k_3+[\tilde{n}.ch/p].k_4+[\tilde{n}.d/p].k_5+[\tilde{n}.e/p].k_6+[\tilde{n}.f/p].k_7+[\tilde{n}.g/p].k_8+[\tilde{n}.h/p].k_9+$   
 $[\tilde{n}.i/p].k_{10}+[\tilde{n}.j/p].k_{11}+[\tilde{n}.k/p].k_{12}+[\tilde{n}.l/p].k_{13}+[\tilde{n}.m/p].k_{14}+[\tilde{n}.n/p].k_{15}+[\tilde{n}.ñ/p].k_{16}+[\tilde{n}.o/p].k_{17}+[\tilde{n}.p/p].$   
 $k_{18}+[\tilde{n}.q/p].k_{19}+[\tilde{n}.r/p].k_{20}+[\tilde{n}.s/p].k_{21}+[\tilde{n}.t/p].k_{22}+[\tilde{n}.u/p].k_{23}+[\tilde{n}.x/p].k_{24}+[\tilde{n}.y/p].k_{25}+[\tilde{n}.z/p].k_{26}+$   
 $\tilde{n}.Z\#/p].k_{27} + \mathbf{w}_{16} = \mathbf{0}$

$[o.a/p].k_1+[o.b/p].k_2+[o.c/p].k_3+[o.ch/p].k_4+[o.d/p].k_5+[o.e/p].k_6+[o.f/p].k_7+[o.g/p].k_8+[o.h/p].k_9+$   
 $[o.i/p].k_{10}+[o.j/p].k_{11}+[o.k/p].k_{12}+[o.l/p].k_{13}+[o.m/p].k_{14}+[o.n/p].k_{15}+[o.ñ/p].k_{16}+[o.o/p].k_{17}+[o.p/p].$   
 $k_{18}+[o.q/p].k_{19}+[o.r/p].k_{20}+[o.s/p].k_{21}+[o.t/p].k_{22}+[o.u/p].k_{23}+[o.x/p].k_{24}+[o.y/p].k_{25}+[o.z/p].k_{26}$   
 $+ [o.Z\#/p].k_{27} + \mathbf{w}_{17} = \mathbf{0}$

$[p.a/p].k_1+[p.b/p].k_2+[p.c/p].k_3+[p.ch/p].k_4+[p.d/p].k_5+[p.e/p].k_6+[p.f/p].k_7+[p.g/p].k_8+[p.h/p].k_9+$   
 $[p.i/p].k_{10}+[p.j/p].k_{11}+[p.k/p].k_{12}+[p.l/p].k_{13}+[p.m/p].k_{14}+[p.n/p].k_{15}+[p.ñ/p].k_{16}+[p.o/p].k_{17}+[p.p/p].$   
 $k_{18}+[p.q/p].k_{19}+[p.r/p].k_{20}+[p.s/p].k_{21}+[p.t/p].k_{22}+[p.u/p].k_{23}+[p.x/p].k_{24}+[p.y/p].k_{25}+[p.z/p].k_{26}$   
 $+ [p.Z\#/p].k_{27} + \mathbf{w}_{18} = \mathbf{0}$

$[q.a/p].k_1+[q.b/p].k_2+[q.c/p].k_3+[q.ch/p].k_4+[q.d/p].k_5+[q.e/p].k_6+[q.f/p].k_7+[q.g/p].k_8+[q.h/p].k_9+$   
 $[q.i/p].k_{10}+[q.j/p].k_{11}+[q.k/p].k_{12}+[q.l/p].k_{13}+[q.m/p].k_{14}+[q.n/p].k_{15}+[q.ñ/p].k_{16}+[q.o/p].k_{17}+[q.p/p].$   
 $k_{18}+[q.q/p].k_{19}+[q.r/p].k_{20}+[q.s/p].k_{21}+[q.t/p].k_{22}+[q.u/p].k_{23}+[q.x/p].k_{24}+[q.y/p].k_{25}+[q.z/p].k_{26}+$   
 $q.Z\#/p].k_{27} + \mathbf{w}_{19} = \mathbf{0}$



[r.a/p].k<sub>1</sub>+ [r.b/p].k<sub>2</sub>+ [r.c/p].k<sub>3</sub>+ [r.ch/p].k<sub>4</sub>+ [r.d/p].k<sub>5</sub>+ [r.e/p].k<sub>6</sub>+ [r.f/p].k<sub>7</sub>+ [r.g/p].k<sub>8</sub>+ [r.h/p].k<sub>9</sub>+ [r.i/p].k<sub>10</sub>+ [r.j/p].k<sub>11</sub>+ [r.k/p].k<sub>12</sub>+ [r.l/p].k<sub>13</sub>+ [r.m/p].k<sub>14</sub>+ [r.n/p].k<sub>15</sub>+ [r.ñ/p].k<sub>16</sub>+ [r.o/p].k<sub>17</sub>+ [r.p/p].k<sub>18</sub>+ [r.q/p].k<sub>19</sub>+ [r.r/p].k<sub>20</sub>+ [r.s/p].k<sub>21</sub>+ [r.t/p].k<sub>22</sub>+ [r.u/p].k<sub>23</sub>+ [r.x/p].k<sub>24</sub>+ [r.y/p].k<sub>25</sub>+ [r.z/p].k<sub>26</sub> + [r.Z#/p].k<sub>20</sub>+  
**w<sub>20</sub> = 0**

[s.a/p].k<sub>1</sub>+ [s.b/p].k<sub>2</sub>+ [s.c/p].k<sub>3</sub>+ [s.ch/p].k<sub>4</sub>+ [s.d/p].k<sub>5</sub>+ [s.e/p].k<sub>6</sub>+ [s.f/p].k<sub>7</sub>+ [s.g/p].k<sub>8</sub>+ [s.h/p].k<sub>9</sub>+ [s.i/p].k<sub>10</sub>+ [s.j/p].k<sub>11</sub>+ [s.k/p].k<sub>12</sub>+ [s.l/p].k<sub>13</sub>+ [s.m/p].k<sub>14</sub>+ [s.n/p].k<sub>15</sub>+ [s.ñ/p].k<sub>16</sub>+ [s.o/p].k<sub>17</sub>+ [s.p/p].k<sub>18</sub>+ [s.q/p].k<sub>19</sub>+ [s.r/p].k<sub>20</sub>+ [s.s/p].k<sub>21</sub>+ [s.t/p].k<sub>22</sub>+ [s.u/p].k<sub>23</sub>+ [s.x/p].k<sub>24</sub>+ [s.y/p].k<sub>25</sub>+ [s.z/p].k<sub>26</sub> + [s.Z#/p].k<sub>27</sub>+  
**w<sub>21</sub> = 0**

[t.a/p].k<sub>1</sub>+ [t.b/p].k<sub>2</sub>+ [t.c/p].k<sub>3</sub>+ [t.ch/p].k<sub>4</sub>+ [t.d/p].k<sub>5</sub>+ [t.e/p].k<sub>6</sub>+ [t.f/p].k<sub>7</sub>+ [t.g/p].k<sub>8</sub>+ [t.h/p].k<sub>9</sub>+ [t.i/p].k<sub>10</sub>+ [t.j/p].k<sub>11</sub>+ [t.k/p].k<sub>12</sub>+ [t.l/p].k<sub>13</sub>+ [t.m/p].k<sub>14</sub>+ [t.n/p].k<sub>15</sub>+ [t.ñ/p].k<sub>16</sub>+ [t.o/p].k<sub>17</sub>+ [t.p/p].k<sub>18</sub>+ [t.q/p].k<sub>19</sub>+ [t.r/p].k<sub>20</sub>+ [t.s/p].k<sub>21</sub>+ [t.t/p].k<sub>22</sub>+ [t.u/p].k<sub>23</sub>+ [t.x/p].k<sub>24</sub>+ [t.y/p].k<sub>25</sub>+ [t.z/p].k<sub>26</sub>+ [t.Z#/p].k<sub>27</sub> +  
**w<sub>22</sub> = 0**

[u.a/p].k<sub>1</sub>+ [u.b/p].k<sub>2</sub>+ [u.c/p].k<sub>3</sub>+ [u.ch/p].k<sub>4</sub>+ [u.d/p].k<sub>5</sub>+ [u.e/p].k<sub>6</sub>+ [u.f/p].k<sub>7</sub>+ [u.g/p].k<sub>8</sub>+ [u.h/p].k<sub>9</sub>+ [u.i/p].k<sub>10</sub>+ [u.j/p].k<sub>11</sub>+ [u.k/p].k<sub>12</sub>+ [u.l/p].k<sub>13</sub>+ [u.m/p].k<sub>14</sub>+ [u.n/p].k<sub>15</sub>+ [u.ñ/p].k<sub>16</sub>+ [u.o/p].k<sub>17</sub>+ [u.p/p].k<sub>18</sub>+ [u.q/p].k<sub>19</sub>+ [u.r/p].k<sub>20</sub>+ [u.s/p].k<sub>21</sub>+ [u.t/p].k<sub>22</sub>+ [u.u/p].k<sub>23</sub>+ [u.x/p].k<sub>24</sub>+ [u.y/p].k<sub>25</sub>+ [u.z/p].k<sub>26</sub> + [u.Z#/p].k<sub>27</sub>+  
**w<sub>23</sub> = 0**

[x.a/p].k<sub>1</sub>+ [x.b/p].k<sub>2</sub>+ [x.c/p].k<sub>3</sub>+ [x.ch/p].k<sub>4</sub>+ [x.d/p].k<sub>5</sub>+ [x.e/p].k<sub>6</sub>+ [x.f/p].k<sub>7</sub>+ [x.g/p].k<sub>8</sub>+ [x.h/p].k<sub>9</sub>+ [x.i/p].k<sub>10</sub>+ [x.j/p].k<sub>11</sub>+ [x.k/p].k<sub>12</sub>+ [x.l/p].k<sub>13</sub>+ [x.m/p].k<sub>14</sub>+ [x.n/p].k<sub>15</sub>+ [x.ñ/p].k<sub>16</sub>+ [x.o/p].k<sub>17</sub>+ [x.p/p].k<sub>18</sub>+ [x.q/p].k<sub>19</sub>+ [x.r/p].k<sub>20</sub>+ [x.s/p].k<sub>21</sub>+ [x.t/p].k<sub>22</sub>+ [x.u/p].k<sub>23</sub>+ [x.x/p].k<sub>24</sub>+ [x.y/p].k<sub>25</sub>+ [x.z/p].k<sub>26</sub> + [x.Z#/p].k<sub>27</sub>+  
**w<sub>24</sub> = 0**



$$8+[x.q/p].k_{19}+[x.r/p].k_{20}+[x.s/p].k_{21}+[x.t/p].k_{22}+[x.u/p].k_{23}+[x.x/p].k_{24}+[x.y/p].k_{25}+[x.z/p].k_{26} \\ +[x.Z\#/p].k_{27} + \mathbf{w}_{24} = \mathbf{0}$$

$$[y.a/p].k_1+[y.b/p].k_2+[y.c/p].k_3+[y.ch/p].k_4+[y.d/p].k_5+[y.e/p].k_6+[y.f/p].k_7+[y.g/p].k_8+[y.h/p].k_9+[ \\ y.i/p].k_{10}+[y.j/p].k_{11}+[y.k/p].k_{12}+[y.l/p].k_{13}+[y.m/p].k_{14}+[y.n/p].k_{15}+[y.ñ/p].k_{16}+[y.o/p].k_{17}+[y.p/p].k_{18} \\ 8+[y.q/p].k_{19}+[y.r/p].k_{20}+[y.s/p].k_{21}+[y.t/p].k_{22}+[y.u/p].k_{23}+[y.x/p].k_{24}+[y.y/p].k_{25}+[y.z/p].k_{26} \\ +[y.Z\#/p].k_{27} + \mathbf{w}_{25} = \mathbf{0}$$

$$[z.a/p].k_1+[z.b/p].k_2+[z.c/p].k_3+[z.ch/p].k_4+[z.d/p].k_5+[z.e/p].k_6+[z.f/p].k_7+[z.g/p].k_8+[z.h/p].k_9+[ \\ z.i/p].k_{10}+[z.j/p].k_{11}+[z.k/p].k_{12}+[z.l/p].k_{13}+[z.m/p].k_{14}+[z.n/p].k_{15}+[z.ñ/p].k_{16}+[z.o/p].k_{17}+[z.p/p].k_{18} \\ 8+[z.q/p].k_{19}+[z.r/p].k_{20}+[z.s/p].k_{21}+[z.t/p].k_{22}+[z.u/p].k_{23}+[z.x/p].k_{24}+[z.y/p].k_{25}+[z.z/p].k_{26} \\ +[z.Z\#/p].k_{27} + \mathbf{w}_{26} = \mathbf{0}$$

$$[Z\#.a/p].k_1+[Z\#.b/p].k_2+[Z\#.c/p].k_3+[Z\#.ch/p].k_4+[Z\#.d/p].k_5+[Z\#.e/p].k_6+[Z\#.f/p].k_7+[Z\#.g/p].k_8 \\ +[Z\#.h/p].k_9+[Z\#.i/p].k_{10}+[Z\#.j/p].k_{11}+[Z\#.k/p].k_{12}+[Z\#.l/p].k_{13}+[Z\#.m/p].k_{14}+[Z\#.n/p].k_{15}+[Z\#.ñ/p] \\ .k_{16}+[Z\#.o/p].k_{17}+[Z\#.p/p].k_{18}+[Z\#.q/p].k_{19}+[Z\#.r/p].k_{20}+[Z\#.s/p].k_{21}+[Z\#.t/p].k_{22}+[Z\#.u/p].k_{23}+[ \\ Z\#.x/p].k_{24}+[Z\#.y/p].k_{25}+[Z\#.z/p].k_{26} + [Z\#.Z\#/p].k_{27} + \mathbf{w}_{27} = \mathbf{0}$$

### Donde

$$[a.a/p] = d_{203}+ d_{204}+ d_{205}+ d_{206}+ d_{207}+ d_{208}+ d_{209}+ d_{210}+ d_{173}+ d_{174}+ d_{175}+ d_{195}+ d_{196}+ \\ d_{197}+ d_{198}+ d_{199}+ d_{200}$$

$$[a.b/p] = d_{196}+ d_{197}+ d_{198}+ d_{199}+ d_{200}$$

Si denominamos **A** a la matriz obtenida de la **TABLA 1**.



La matriz  $\mathbf{A.W}^{-1}$  (Matriz ponderada) resulta de dividir cada elemento de la matriz  $\mathbf{A}$  por el peso correspondiente o lo que es lo mismo de multiplicarlo por la longitud del tramo, ya que  $\mathbf{d}=1/p$ .

$\mathbf{A}^t$  es la matriz transpuesta de  $\mathbf{A}$

Luego si multiplicamos  $\mathbf{A.W}^{-1}$  por  $\mathbf{A}^t$  obtendremos la matriz  $\mathbf{N}$

$\mathbf{N}^{-1}$  (inversa de  $\mathbf{N}$ ) es la matriz de los coeficientes de las ecuaciones normales, si multiplicamos dicha matriz por la matriz de los términos independientes ( $\mathbf{w}_i$ ), obtendremos la solución de las ecuaciones y las raíces  $\mathbf{k}_i$  ( matriz  $\mathbf{K}$ ), que nos permitirá calcular las correcciones  $\mathbf{v}_i$ .

La resolución del sistema de ecuaciones normales puede ser efectuada por operaciones con matrices, como se indica en el párrafo anterior, mediante la utilización planilla de calculo. Una vez obtenidos los valores de  $\mathbf{k}_i$  procederemos al calculo de la correcciones  $\mathbf{v}_i$ .

En forma matricial sería

$$\mathbf{A.W}^{-1} . \mathbf{A}^t . \mathbf{K} = \mathbf{V}$$

### Calculo de los valores de $\mathbf{v}_i$

Otra forma de realizar el cálculo de las correcciones  $\mathbf{v}_i$  es utilizando la TABLA 2 mediante la cual podemos, una vez que resolvimos las ecuaciones normales y obtenido los valores  $\mathbf{k}_i$ , proceder a calcular las correcciones.





|                                  | d <sub>1</sub>                      | d <sub>2</sub>                      | d <sub>3</sub>                      | d <sub>4</sub>                      | d <sub>5</sub>                      | d <sub>6</sub>                      | d <sub>7</sub>                      | d <sub>8</sub>                      | d <sub>9</sub>                      | d <sub>10</sub>                     | d <sub>11</sub>                     | d <sub>12</sub>                     | d <sub>13</sub>                     | d <sub>14</sub>                     | d <sub>15</sub>                     | d <sub>16</sub>                     | d <sub>17</sub>                     | d <sub>18</sub>                     | d <sub>19</sub>                     | d <sub>20</sub>                     |                                     |                                     |                                  |
|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------------------------|
| k <sub>1</sub> * d <sub>i</sub>  |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>2</sub> * d <sub>i</sub>  |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>3</sub> * d <sub>i</sub>  |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>4</sub> * d <sub>i</sub>  |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>5</sub> * d <sub>i</sub>  |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>6</sub> * d <sub>i</sub>  |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>7</sub> * d <sub>i</sub>  |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>8</sub> * d <sub>i</sub>  |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>9</sub> * d <sub>i</sub>  |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>10</sub> * d <sub>i</sub> |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>11</sub> * d <sub>i</sub> |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>12</sub> * d <sub>i</sub> |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>13</sub> * d <sub>i</sub> |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>14</sub> * d <sub>i</sub> |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>15</sub> * d <sub>i</sub> |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>16</sub> * d <sub>i</sub> |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>17</sub> * d <sub>i</sub> |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>18</sub> * d <sub>i</sub> |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>19</sub> * d <sub>i</sub> |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>20</sub> * d <sub>i</sub> |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>21</sub> * d <sub>i</sub> |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>22</sub> * d <sub>i</sub> |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>23</sub> * d <sub>i</sub> |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     | k <sub>23</sub> *d <sub>12</sub>    | k <sub>23</sub> *d <sub>13</sub>    | k <sub>23</sub> *d <sub>14</sub>    | k <sub>23</sub> *d <sub>15</sub>    | k <sub>23</sub> *d <sub>16</sub>    |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>24</sub> * d <sub>i</sub> |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>25</sub> * d <sub>i</sub> |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>26</sub> * d <sub>i</sub> |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                  |
| k <sub>27</sub> * d <sub>i</sub> |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     | k <sub>27</sub> *d <sub>17</sub>    | k <sub>27</sub> *d <sub>18</sub>    | k <sub>27</sub> *d <sub>19</sub>    | k <sub>27</sub> *d <sub>20</sub> |
| V <sub>i</sub>                   | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> | d<br>k <sub>i</sub> *d <sub>i</sub> |                                  |

TABLA2: Cálculo de los valores de las correcciones v<sub>i</sub>



| Polígonos                        | d <sub>21</sub>                  | d <sub>22</sub>                  | d <sub>23</sub>                  | d <sub>24</sub>                  | d <sub>25</sub>                  | d <sub>26</sub>                  | d <sub>27</sub>                  | d <sub>28</sub>                  | d <sub>29</sub>                  | d <sub>30</sub>                  | d <sub>31</sub>                  | d <sub>32</sub>                  | d <sub>33</sub> | d <sub>34</sub>                  | d <sub>35</sub>                  | d <sub>36</sub>                  | d <sub>37</sub>                  | d <sub>38</sub>                  | d <sub>39</sub>                  | d <sub>40</sub>                  |                                  |                                  |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| k <sub>1</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>2</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>3</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>4</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>5</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>6</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>7</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>8</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>9</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>10</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>11</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>12</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>13</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>14</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>15</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>16</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>17</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>18</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>19</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>20</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>21</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>22</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>23</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  | k <sub>23</sub> *d <sub>25</sub> | k <sub>23</sub> *d <sub>26</sub> | k <sub>23</sub> *d <sub>27</sub> | k <sub>23</sub> *d <sub>28</sub> | k <sub>23</sub> *d <sub>29</sub> | k <sub>23</sub> *d <sub>30</sub> | k <sub>23</sub> *d <sub>31</sub> |                                  |                 | k <sub>23</sub> *d <sub>33</sub> | k <sub>23</sub> *d <sub>34</sub> | k <sub>23</sub> *d <sub>35</sub> | k <sub>23</sub> *d <sub>36</sub> | k <sub>23</sub> *d <sub>37</sub> | k <sub>23</sub> *d <sub>38</sub> | k <sub>23</sub> *d <sub>39</sub> | k <sub>23</sub> *d <sub>40</sub> |                                  |
| k <sub>24</sub> * d <sub>i</sub> |                                  | k <sub>24</sub> *d <sub>22</sub> | k <sub>24</sub> *d <sub>23</sub> | k <sub>24</sub> *d <sub>24</sub> | k <sub>24</sub> *d <sub>25</sub> | k <sub>24</sub> *d <sub>26</sub> | k <sub>24</sub> *d <sub>27</sub> | k <sub>24</sub> *d <sub>28</sub> | k <sub>24</sub> *d <sub>29</sub> | k <sub>24</sub> *d <sub>30</sub> | k <sub>24</sub> *d <sub>31</sub> | k <sub>24</sub> *d <sub>32</sub> |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>25</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| k <sub>26</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  | k <sub>26</sub> *d <sub>40</sub> |
| k <sub>27</sub> * d <sub>i</sub> | k <sub>27</sub> *d <sub>21</sub> | k <sub>27</sub> *d <sub>22</sub> | k <sub>27</sub> *d <sub>23</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                 |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
| v <sub>i</sub>                   | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di      | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       |                                  |

TABLA2: Cálculo de los valores de las correcciones v<sub>i</sub>



|                                  | d <sub>41</sub>                  | d <sub>42</sub>                  | d <sub>43</sub>                  | d <sub>44</sub>                  | d <sub>45</sub>                  | d <sub>46</sub>                  | d <sub>47</sub>                  | d <sub>48</sub>                  | d <sub>49</sub>                  | d <sub>50</sub>                  | d <sub>51</sub>                  | d <sub>52</sub>                  | d <sub>53</sub>                  | d <sub>54</sub>                  | d <sub>55</sub>                  | d <sub>56</sub>                  | d <sub>57</sub>                  | d <sub>58</sub>                  | d <sub>59</sub>                  | d <sub>60</sub>                  |       |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-------|
| k <sub>1</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>2</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>3</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>4</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>5</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>6</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>7</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>8</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>9</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>10</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>11</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>12</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>13</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>14</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>15</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>16</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>17</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>18</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  | k <sub>18</sub> 'd <sub>54</sub> | k <sub>18</sub> 'd <sub>55</sub> | k <sub>18</sub> 'd <sub>56</sub> | k <sub>18</sub> 'd <sub>57</sub> | k <sub>18</sub> 'd <sub>58</sub> |                                  | k <sub>18</sub> 'd <sub>60</sub> |       |
| k <sub>19</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  | k <sub>19</sub> 'd <sub>46</sub> | k <sub>19</sub> 'd <sub>47</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>20</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  | k <sub>20</sub> 'd <sub>48</sub> | k <sub>20</sub> 'd <sub>49</sub> | k <sub>20</sub> 'd <sub>50</sub> | k <sub>20</sub> 'd <sub>51</sub> | k <sub>20</sub> 'd <sub>52</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>21</sub> * d <sub>i</sub> |                                  | k <sub>21</sub> 'd <sub>42</sub> | k <sub>21</sub> 'd <sub>43</sub> | k <sub>21</sub> 'd <sub>44</sub> | k <sub>21</sub> 'd <sub>45</sub> | k <sub>21</sub> 'd <sub>46</sub> | k <sub>21</sub> 'd <sub>47</sub> | k <sub>21</sub> 'd <sub>48</sub> | k <sub>21</sub> 'd <sub>49</sub> | k <sub>21</sub> 'd <sub>50</sub> | k <sub>21</sub> 'd <sub>51</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>22</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  | k <sub>22</sub> 'd <sub>53</sub> | k <sub>22</sub> 'd <sub>54</sub> | k <sub>22</sub> 'd <sub>55</sub> | k <sub>22</sub> 'd <sub>56</sub> | k <sub>22</sub> 'd <sub>57</sub> | k <sub>22</sub> 'd <sub>58</sub> | k <sub>22</sub> 'd <sub>59</sub> |                                  |       |
| k <sub>23</sub> * d <sub>i</sub> | k <sub>23</sub> 'd <sub>41</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>24</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>25</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>26</sub> * d <sub>i</sub> | k <sub>26</sub> 'd <sub>41</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  | k <sub>26</sub> 'd <sub>52</sub> | k <sub>26</sub> 'd <sub>53</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| k <sub>27</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |       |
| v <sub>i</sub>                   | d                                | d                                | d                                | d                                | d                                | d                                | d                                | d                                | d                                | d                                | d                                | d                                | d                                | d                                | d                                | d                                | d                                | d                                | d                                | d                                | d     |
|                                  | ki'di                            | ki'di                            | ki'di                            | ki'di                            | ki'di                            | ki'di                            | ki'di                            | ki'di                            | ki'di                            | ki'di                            | ki'di                            | ki'di                            | ki'di                            | ki'di                            | ki'di                            | ki'di                            | ki'di                            | ki'di                            | ki'di                            | ki'di                            | ki'di |

TABLA2: Cálculo de los valores de las correcciones v<sub>i</sub>



|                                  | d <sub>61</sub>                  | d <sub>62</sub>                  | d <sub>63</sub>                  | d <sub>64</sub>                  | d <sub>65</sub>                  | d <sub>66</sub>                  | d <sub>67</sub>                  | d <sub>68</sub>                  | d <sub>69</sub>                  | d <sub>70</sub>                  | d <sub>71</sub>                  | d <sub>72</sub>                  | d <sub>73</sub>                  | d <sub>74</sub>                  | d <sub>75</sub>                  | d <sub>76</sub>                  | d <sub>77</sub>                  | d <sub>78</sub>                  | d <sub>79</sub>                  | d <sub>80</sub>                  |            |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|------------|
| k <sub>1</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>2</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>3</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>4</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>5</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>6</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>7</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>8</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>9</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>10</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>11</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>12</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>13</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>14</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  | k <sub>14</sub> *d <sub>65</sub> | k <sub>14</sub> *d <sub>66</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>15</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>16</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  | k <sub>16</sub> *d <sub>77</sub> | k <sub>16</sub> *d <sub>77</sub> | k <sub>16</sub> *d <sub>77</sub> | k <sub>16</sub> *d <sub>77</sub> |            |
| k <sub>17</sub> * d <sub>i</sub> | k <sub>17</sub> *d <sub>61</sub> | k <sub>17</sub> *d <sub>62</sub> | k <sub>17</sub> *d <sub>63</sub> | k <sub>17</sub> *d <sub>64</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>18</sub> * d <sub>i</sub> | k <sub>18</sub> *d <sub>61</sub> | k <sub>18</sub> *d <sub>62</sub> | k <sub>18</sub> *d <sub>63</sub> | k <sub>18</sub> *d <sub>64</sub> | k <sub>18</sub> *d <sub>65</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>19</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  | k <sub>19</sub> *d <sub>67</sub> | k <sub>19</sub> *d <sub>68</sub> | k <sub>19</sub> *d <sub>69</sub> | k <sub>19</sub> *d <sub>70</sub> | k <sub>19</sub> *d <sub>71</sub> | k <sub>19</sub> *d <sub>72</sub> | k <sub>19</sub> *d <sub>73</sub> | k <sub>19</sub> *d <sub>74</sub> | k <sub>19</sub> *d <sub>75</sub> | k <sub>19</sub> *d <sub>76</sub> | k <sub>19</sub> *d <sub>77</sub> | k <sub>19</sub> *d <sub>78</sub> | k <sub>19</sub> *d <sub>79</sub> | k <sub>19</sub> *d <sub>80</sub> |            |
| k <sub>20</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  | k <sub>20</sub> *d <sub>68</sub> | k <sub>20</sub> *d <sub>69</sub> | k <sub>20</sub> *d <sub>70</sub> | k <sub>20</sub> *d <sub>71</sub> | k <sub>20</sub> *d <sub>72</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>21</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>22</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>23</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>24</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>25</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  | k <sub>25</sub> *d <sub>66</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>26</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  | k <sub>26</sub> *d <sub>67</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| k <sub>27</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |            |
| v <sub>i</sub>                   | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di                       | d<br>ki*di |

TABLA2: Cálculo de los valores de las correcciones v<sub>i</sub>



|                                  | d <sub>81</sub>                  | d <sub>82</sub>                  | d <sub>83</sub>                  | d <sub>84</sub>                  | d <sub>85</sub>                  | d <sub>86</sub>                  | d <sub>87</sub>                  | d <sub>88</sub>                  | d <sub>89</sub>                  | d <sub>90</sub>                  | d <sub>91</sub>                  | d <sub>92</sub>                  | d <sub>93</sub>                  | d <sub>94</sub>                  | d <sub>95</sub>                  | d <sub>96</sub>                  | d <sub>97</sub>                  | d <sub>98</sub>                  | d <sub>99</sub>                  | d <sub>100</sub>                  |                                   |            |  |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|-----------------------------------|------------|--|
| k <sub>1</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>2</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>3</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>4</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>5</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>6</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>7</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>8</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>9</sub> * d <sub>i</sub>  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>10</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>11</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>12</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  | k <sub>12</sub> 'd <sub>97</sub> | k <sub>12</sub> 'd <sub>98</sub> |                                  |                                   |                                   |            |  |
| k <sub>13</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  | k <sub>13</sub> 'd <sub>88</sub> | k <sub>13</sub> 'd <sub>89</sub> |                                  |                                  |                                  | k <sub>13</sub> 'd <sub>93</sub> | k <sub>13</sub> 'd <sub>94</sub> | k <sub>13</sub> 'd <sub>95</sub> | k <sub>13</sub> 'd <sub>96</sub> | k <sub>13</sub> 'd <sub>97</sub> | k <sub>13</sub> 'd <sub>98</sub> | k <sub>13</sub> 'd <sub>99</sub> | k <sub>13</sub> 'd <sub>100</sub> |                                   |            |  |
| k <sub>14</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  | k <sub>14</sub> 'd <sub>85</sub> | k <sub>14</sub> 'd <sub>86</sub> | k <sub>14</sub> 'd <sub>87</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  | k <sub>14</sub> 'd <sub>99</sub>  | k <sub>14</sub> 'd <sub>100</sub> |            |  |
| k <sub>15</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>16</sub> * d <sub>i</sub> | k <sub>16</sub> 'd <sub>81</sub> | k <sub>16</sub> 'd <sub>82</sub> | k <sub>16</sub> 'd <sub>83</sub> | k <sub>16</sub> 'd <sub>84</sub> | k <sub>16</sub> 'd <sub>85</sub> | k <sub>16</sub> 'd <sub>86</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>17</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  | k <sub>17</sub> 'd <sub>87</sub> | k <sub>17</sub> 'd <sub>88</sub> | k <sub>17</sub> 'd <sub>89</sub> | k <sub>17</sub> 'd <sub>90</sub> | k <sub>17</sub> 'd <sub>91</sub> | k <sub>17</sub> 'd <sub>92</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>18</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>19</sub> * d <sub>i</sub> | k <sub>19</sub> 'd <sub>81</sub> | k <sub>19</sub> 'd <sub>82</sub> | k <sub>19</sub> 'd <sub>83</sub> | k <sub>19</sub> 'd <sub>84</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>20</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>21</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>22</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>23</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>24</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>25</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>26</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| k <sub>27</sub> * d <sub>i</sub> |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                   |                                   |            |  |
| <b>v<sub>i</sub></b>             | d<br>ki'di                       | d<br>ki'di                       | d<br>ki'di                       | d<br>ki'di                       | d<br>ki'di                       | d<br>ki'di                       | d<br>ki'di                       | d<br>ki'di                       | d<br>ki'di                       | d<br>ki'di                       | d<br>ki'di                       | d<br>ki'di                       | d<br>ki'di                       | d<br>ki'di                       | d<br>ki'di                       | d<br>ki'di                       | d<br>ki'di                       | d<br>ki'di                       | d<br>ki'di                       | d<br>ki'di                        | d<br>ki'di                        | d<br>ki'di |  |

TABLA2: Cálculo de los valores de las correcciones v<sub>i</sub>



|                | $d_{101}$          | $d_{102}$          | $d_{103}$          | $d_{104}$          | $d_{105}$          | $d_{106}$          | $d_{107}$          | $d_{108}$          | $d_{109}$          | $d_{110}$          | $d_{111}$          | $d_{112}$          | $d_{113}$          | $d_{114}$          | $d_{115}$          | $d_{116}$          | $d_{117}$          | $d_{118}$          | $d_{119}$          | $d_{120}$          |
|----------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| $k_1 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_2 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_3 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_4 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_5 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_6 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_7 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_8 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_9 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{10} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{11} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    | $k_{11} * d_{114}$ | $k_{11} * d_{115}$ | $k_{11} * d_{116}$ | $k_{11} * d_{117}$ | $k_{11} * d_{118}$ | $k_{11} * d_{119}$ | $k_{11} * d_{120}$ |
| $k_{12} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{13} * d_i$ | $k_{13} * d_{101}$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{14} * d_i$ | $k_{14} * d_{101}$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{15} * d_i$ |                    | $k_{15} * d_{102}$ | $k_{15} * d_{103}$ | $k_{15} * d_{104}$ | $k_{15} * d_{105}$ | $k_{15} * d_{106}$ | $k_{15} * d_{107}$ | $k_{15} * d_{108}$ | $k_{15} * d_{109}$ | $k_{15} * d_{110}$ | $k_{15} * d_{111}$ |                    | $k_{15} * d_{113}$ | $k_{15} * d_{114}$ | $k_{15} * d_{115}$ | $k_{15} * d_{116}$ | $k_{15} * d_{117}$ | $k_{15} * d_{118}$ | $k_{15} * d_{119}$ | $k_{15} * d_{120}$ |
| $k_{16} * d_i$ |                    | $k_{16} * d_{102}$ | $k_{16} * d_{103}$ | $k_{16} * d_{104}$ | $k_{16} * d_{105}$ | $k_{16} * d_{106}$ | $k_{16} * d_{107}$ | $k_{16} * d_{108}$ | $k_{16} * d_{109}$ | $k_{16} * d_{110}$ | $k_{16} * d_{111}$ | $k_{16} * d_{112}$ |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{17} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{18} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{19} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{20} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{21} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{22} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{23} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{24} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{25} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{26} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{27} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $v_i$          | $d / k_i * d_i$    | $d / k_i * d_i$    | $d / k_i * d_i$    | $d / k_i * d_i$    | $d / k_i * d_i$    | $d / k_i * d_i$    | $d / k_i * d_i$    | $d / k_i * d_i$    | $d / k_i * d_i$    | $d / k_i * d_i$    | $d / k_i * d_i$    | $d / k_i * d_i$    | $d / k_i * d_i$    | $d / k_i * d_i$    | $d / k_i * d_i$    | $d / k_i * d_i$    | $d / k_i * d_i$    | $d / k_i * d_i$    | $d / k_i * d_i$    | $d / k_i * d_i$    |

TABLA2: Cálculo de los valores de las correcciones  $v_i$



|                | $d_{121}$          | $d_{122}$          | $d_{123}$          | $d_{124}$          | $d_{125}$          | $d_{126}$          | $d_{127}$          | $d_{128}$          | $d_{129}$          | $d_{130}$          | $d_{131}$          | $d_{112}$          | $d_{133}$          | $d_{134}$          | $d_{135}$          | $d_{136}$          | $d_{137}$          | $d_{138}$          | $d_{139}$          | $d_{140}$          |
|----------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| $k_1 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_2 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_3 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_4 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_5 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_6 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_7 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_8 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_9 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    | $k_9 * d_{129}$    | $k_9 * d_{130}$    | $k_9 * d_{131}$    | $k_9 * d_{132}$    | $k_9 * d_{133}$    |                    |                    |                    |                    |                    |                    |                    |
| $k_{10} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    | $k_{10} * d_{134}$ | $k_{10} * d_{135}$ | $k_{10} * d_{136}$ | $k_{10} * d_{137}$ | $k_{10} * d_{138}$ | $k_{10} * d_{139}$ | $k_{10} * d_{140}$ |
| $k_{11} * d_i$ | $k_{11} * d_{121}$ |                    | $k_{11} * d_{123}$ |                    |                    |                    |                    |                    |                    |                    |                    | $k_{11} * d_{132}$ | $k_{11} * d_{133}$ | $k_{11} * d_{134}$ | $k_{11} * d_{135}$ | $k_{11} * d_{136}$ | $k_{11} * d_{137}$ | $k_{11} * d_{138}$ | $k_{11} * d_{139}$ | $k_{11} * d_{140}$ |
| $k_{12} * d_i$ |                    |                    |                    | $k_{12} * d_{124}$ | $k_{12} * d_{125}$ | $k_{12} * d_{126}$ | $k_{12} * d_{127}$ | $k_{12} * d_{128}$ | $k_{12} * d_{129}$ | $k_{12} * d_{130}$ | $k_{12} * d_{131}$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{13} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{14} * d_i$ |                    | $k_{14} * d_{122}$ | $k_{14} * d_{123}$ | $k_{14} * d_{124}$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{15} * d_i$ | $k_{15} * d_{121}$ | $k_{15} * d_{122}$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{16} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{17} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{18} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{19} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{20} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{21} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{22} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{23} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{24} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{25} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{26} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{27} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $v_i$          | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ |

TABLA2: Cálculo de los valores de las correcciones  $v_i$



|                | $d_{141}$          | $d_{142}$          | $d_{143}$          | $d_{144}$          | $d_{145}$          | $d_{146}$          | $d_{147}$          | $d_{148}$          | $d_{149}$          | $d_{150}$          | $d_{151}$          | $d_{152}$          | $d_{153}$          | $d_{154}$          | $d_{155}$          | $d_{156}$          | $d_{157}$          | $d_{158}$          | $d_{159}$          | $d_{160}$          |                    |
|----------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| $k_1 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_2 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_3 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_4 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_5 * d_i$    |                    |                    | $k_5 * d_{143}$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_6 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_7 * d_i$    |                    |                    |                    | $k_7 * d_{144}$    | $k_7 * d_{145}$    | $k_7 * d_{146}$    | $k_7 * d_{147}$    | $k_7 * d_{148}$    |                    |                    |                    |                    |                    |                    |                    |                    |                    | $k_7 * d_{158}$    | $k_7 * d_{159}$    | $k_7 * d_{160}$    |                    |
| $k_8 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    | $k_8 * d_{149}$    |                    | $k_8 * d_{151}$    | $k_8 * d_{152}$    | $k_8 * d_{153}$    | $k_8 * d_{154}$    |                    | $k_8 * d_{156}$    | $k_8 * d_{157}$    | $k_8 * d_{158}$    | $k_8 * d_{159}$    | $k_8 * d_{160}$    |                    |
| $k_9 * d_i$    |                    |                    |                    |                    |                    |                    |                    |                    | $k_9 * d_{150}$    | $k_9 * d_{151}$    | $k_9 * d_{152}$    | $k_9 * d_{153}$    | $k_9 * d_{154}$    | $k_9 * d_{155}$    |                    |                    |                    |                    |                    |                    |                    |
| $k_{10} * d_i$ |                    | $k_{10} * d_{142}$ | $k_{10} * d_{143}$ | $k_{10} * d_{144}$ | $k_{10} * d_{145}$ | $k_{10} * d_{146}$ | $k_{10} * d_{147}$ | $k_{10} * d_{148}$ | $k_{10} * d_{149}$ | $k_{10} * d_{150}$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{11} * d_i$ | $k_{11} * d_{141}$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{12} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{13} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{14} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{15} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{16} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{17} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{18} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{19} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{20} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{21} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{22} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{23} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{24} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{25} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{26} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $k_{27} * d_i$ |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |
| $v_i$          | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ | $d$<br>$k_i * d_i$ |

TABLA2: Cálculo de los valores de las correcciones  $v_i$





|                | $d_{161}$       | $d_{162}$       | $d_{163}$       | $d_{164}$       | $d_{165}$       | $d_{166}$       | $d_{167}$       | $d_{168}$       | $d_{169}$       | $d_{170}$       | $d_{171}$       | $d_{172}$       | $d_{173}$       | $d_{174}$       | $d_{175}$       | $d_{176}$       | $d_{177}$       | $d_{178}$       | $d_{179}$       | $d_{180}$       |                 |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| $k_1 * d_i$    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | $k_1 * d_{173}$ | $k_1 * d_{174}$ | $k_1 * d_{175}$ |                 |                 |                 |                 |                 |                 |
| $k_2 * d_i$    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_3 * d_i$    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | $k_3 * d_{176}$ |                 |                 |                 |                 |
| $k_4 * d_i$    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | $k_4 * d_{177}$ | $k_4 * d_{178}$ |                 |                 |
| $k_5 * d_i$    |                 |                 |                 |                 |                 |                 |                 |                 | $k_5 * d_{168}$ | $k_5 * d_{169}$ | $k_5 * d_{170}$ | $k_5 * d_{171}$ | $k_5 * d_{172}$ | $k_5 * d_{173}$ | $k_5 * d_{174}$ | $k_5 * d_{175}$ | $k_5 * d_{176}$ | $k_5 * d_{177}$ | $k_5 * d_{178}$ | $k_5 * d_{179}$ |                 |
| $k_6 * d_i$    |                 |                 |                 |                 | $k_6 * d_{165}$ | $k_6 * d_{166}$ | $k_6 * d_{167}$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | $k_6 * d_{180}$ |
| $k_7 * d_i$    | $k_7 * d_{161}$ | $k_7 * d_{162}$ |                 |                 | $k_7 * d_{165}$ | $k_7 * d_{166}$ | $k_7 * d_{167}$ | $k_7 * d_{168}$ | $k_7 * d_{169}$ | $k_7 * d_{170}$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_8 * d_i$    | $k_8 * d_{161}$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_9 * d_i$    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{10} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{11} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{12} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{13} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{14} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{15} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{16} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{17} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{18} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{19} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{20} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{21} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{22} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{23} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{24} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{25} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{26} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{27} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $v_i$          | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ |

TABLA2: Cálculo de los valores de las correcciones  $v_i$



|                | $d_{181}$       | $d_{182}$       | $d_{183}$       | $d_{184}$       | $d_{185}$       | $d_{186}$       | $d_{187}$       | $d_{188}$       | $d_{189}$       | $d_{190}$       | $d_{191}$       | $d_{192}$       | $d_{193}$       | $d_{194}$       | $d_{195}$       | $d_{196}$       | $d_{197}$       | $d_{198}$       | $d_{199}$       | $d_{200}$       |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| $k_1 * d_i$    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | $k_1 * d_{195}$ | $k_1 * d_{196}$ | $k_1 * d_{197}$ | $k_1 * d_{198}$ | $k_1 * d_{199}$ | $k_1 * d_{200}$ |
| $k_2 * d_i$    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | $k_2 * d_{192}$ | $k_2 * d_{193}$ | $k_2 * d_{194}$ |                 | $k_2 * d_{196}$ | $k_2 * d_{197}$ | $k_2 * d_{198}$ | $k_2 * d_{199}$ | $k_2 * d_{200}$ |
| $k_3 * d_i$    |                 |                 |                 |                 |                 |                 |                 | $k_3 * d_{188}$ | $k_3 * d_{189}$ | $k_3 * d_{190}$ | $k_3 * d_{191}$ | $k_3 * d_{192}$ | $k_3 * d_{193}$ | $k_3 * d_{194}$ | $k_3 * d_{195}$ |                 |                 |                 |                 |                 |
| $k_4 * d_i$    |                 |                 |                 |                 |                 | $k_4 * d_{186}$ | $k_4 * d_{187}$ | $k_4 * d_{188}$ | $k_4 * d_{189}$ | $k_4 * d_{190}$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_5 * d_i$    | $k_5 * d_{181}$ | $k_5 * d_{182}$ | $k_5 * d_{183}$ | $k_5 * d_{184}$ | $k_5 * d_{185}$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_6 * d_i$    | $k_6 * d_{181}$ | $k_6 * d_{182}$ | $k_6 * d_{183}$ | $k_6 * d_{184}$ | $k_6 * d_{185}$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_7 * d_i$    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_8 * d_i$    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_9 * d_i$    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{10} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{11} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{12} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{13} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{14} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{15} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{16} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{17} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{18} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{19} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{20} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{21} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{22} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{23} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{24} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{25} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{26} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $k_{27} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| $v_i$          | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ | $d / k_i * d_i$ |

TABLA2: Cálculo de los valores de las correcciones  $v_i$



|                | $d_{201}$       | $d_{202}$       | $d_{203}$       | $d_{204}$       | $d_{205}$       | $d_{206}$       | $d_{207}$       | $D_{208}$       | $d_{209}$       | $d_{210}$       | $d_{211}$       |                    |                    |  |  |  |  |  |  |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------------------|--------------------|--|--|--|--|--|--|
| $k_1 * d_i$    |                 |                 | $k_1 * d_{203}$ | $k_1 * d_{204}$ | $k_1 * d_{205}$ | $k_1 * d_{206}$ | $k_1 * d_{207}$ | $k_1 * d_{208}$ | $k_1 * d_{209}$ | $k_1 * d_{210}$ |                 |                    |                    |  |  |  |  |  |  |
| $k_2 * d_i$    | $k_2 * d_{201}$ | $k_2 * d_{202}$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_3 * d_i$    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_4 * d_i$    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_5 * d_i$    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_6 * d_i$    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_7 * d_i$    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_8 * d_i$    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_9 * d_i$    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_{10} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_{11} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_{12} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_{13} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_{14} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_{15} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_{16} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_{17} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_{18} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_{19} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_{20} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_{21} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_{22} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | $k_{22} * d_{211}$ |                    |  |  |  |  |  |  |
| $k_{23} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_{24} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_{25} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $k_{26} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    | $k_{26} * d_{211}$ |  |  |  |  |  |  |
| $k_{27} * d_i$ |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                    |                    |  |  |  |  |  |  |
| $v_i$          | $d / k_1 * d_i$ | $d / k_2 * d_i$ | $d / k_1 * d_i$ | $d / k_1 * d_i$ | $d / k_1 * d_i$ | $d / k_1 * d_i$ | $d / k_1 * d_i$ | $d / k_1 * d_i$ | $d / k_1 * d_i$ | $d / k_1 * d_i$ | $d / k_1 * d_i$ | $d / k_1 * d_i$    |                    |  |  |  |  |  |  |

TABLA2: Cálculo de los valores de las correcciones  $v_i$



## ***Analisis de la compensación realizada***

Con las correcciones obtenidas calculamos nuevamente los desniveles de cada tramo. Y hacemos las comprobaciones de cierre de los polígonos.

Una vez finalizado el cálculo procederemos a analizar la compensación realizada, para ello obtendremos el valor de  $\left[ \frac{v^2}{d} \right] = [p.v^2]$  lo comparamos con la sumatoria  $-[k.w]$ , estos valores tiene que ser casi iguales, si esto es así, tendremos la seguridad de que el ajuste realizado es correcto.

El error medio de la unidad de peso será  $m = \sqrt{\frac{[w.k]}{27}}$  mm para 1 Km de nivelación

## ***Plano de referencia y vinculación***

Además de los puntos de la red de geodesia existente, no hay en el ámbito del partido otros puntos de referencia altimétricos. Existía un mojón de una línea de Alta precisión del Instituto Geográfico Militar, ubicado en el predio de la ex Mansión Seré, hoy CASA DE LA MEMORIA Y LA VIDA, pero no pudo ser localizado.

Se propone investigar la existencia del PF N° 5 de la Línea N52, ubicado en las proximidades de la Estación Libertad. Otra posibilidad es utilizar la ménsula del IGM, ubicada un la iglesia catedral de Morón. Y en última instancia la vinculación podría realizarse directamente al Nodal ubicado en en la plaza De Ramos Mejía. Por último sería conveniente obtener información de los Partidos aledaños, para saber si alguno de ellos ha realizado alguna actualización similar en su ambito.



Los resultados obtenidos en todas las tareas se volcarán en planillas como la incluida en el Anexo I. Este anexo contine ademas las planillas con los datos de la red antigua, apartir de los cuales se inició el trabajo.

Se incluye también en el Anexo I un proyecto de ordenanza para dar marco un marco normativo a las tareas planificadas.

En el Anexo II se presentan los resultados obtenidos de la medición de un polígono conformado por ménsulas existentes, con el objeto de evaluar la metodología propuesta y estimar los tiempos de ejecución del proyecto.

En el Anexo III se presentan los planos 1 a 5

### ***Presupuesto***

| ITEM  | UNIDADES | CANTIDAD | IMPORTE           |
|---|----------|----------|-------------------|
| <b>MATERIALES</b>                             |          |          |                   |
| MENSULAS DE BRONCE                            | C/U      | 150      | \$ 6000,00        |
| TORNILOS DE FIJACIÓN                          | C/U      | 300      | \$ 210,00         |
| MATERIALES PARA FIJACIÓN y PINTURA (ESTIMADO) |          |          | \$ 500,00         |
| <b>SUBTOTAL</b>                               |          |          | <b>\$ 6710,00</b> |
| <b>MANO DE OBRA</b>                           |          |          |                   |
| 1 - OFICIAL ALBAÑIL                           | DÍAS     | 20       | \$ 2000,00        |
| 1 - AYUDANTE ALBAÑIL                          | DÍAS     | 20       | \$ 1000,00        |
| <b>SUBTOTAL</b>                               |          |          | <b>\$ 3000,00</b> |
| <b>SEÑALIZACIÓN</b>                           |          |          |                   |
| 1 - AGRIMENSOR                                | DÍAS     | 10       | \$ 5000,00        |
| 1 - AYUDANTE                                  | DÍAS     | 10       | \$ 500,00         |
| <b>SUBTOTAL</b>                               |          |          | <b>\$ 5500,00</b> |
| <b>MEDICIÓN</b>                               |          |          |                   |
| 1 - AGRIMENSOR                                | DÍAS     | 40       | \$ 20000,00       |
| 2 - AYUDANTES                                 | DÍAS     | 40       | \$ 4000,00        |



|  |      |    |                     |
|--|------|----|---------------------|
| <b>SUBTOTAL</b>  |      |    | <b>\$ 24000,00</b>  |
| <b>CÁLCULO, DIBUJO y ELABORACIÓN<br/>INFORME FINAL</b> |      |    |                     |
| 1 - AGRIMENSOR   | DÍAS | 10 | \$ 5000,00          |
| 1 - DIBUJANTE  | DÍAS | 10 | \$ 1000,00          |
| <b>SUBTOTAL</b>  |      |    | <b>\$ 6000,00</b>   |
| <b>TOTAL</b>   |      |    | <b>\$ 45.210,00</b> |

Para la elaboración del presupuesto se ha estimado que el albañil que realiza las tareas de colocación de las ménsulas tiene a su cargo un vehículo para su traslado y el transporte del material necesario. En el caso del agrimensor también se hará cargo del vehículo y del instrumental necesario.

## **Conclusiones**

Si se tiene en cuenta el tiempo transcurrido, se puede inferir que el costo de la red antigua se ha amortizado con creces. Se debe tener en cuenta además que aun faltan realizar importantes obras de infraestructura en el ámbito municipal. Contar con una herramienta como la propuesta brindará seguridad en los trabajos a las empresas particulares y al municipio para el control de las obras que encargue a terceros. Si se piensa que una obra como la que se proyecta tiene una vida útil de no menos de 10 años, debemos concluir que la realización del mismo no representa un gasto, sino una inversión que reducirá costos en el futuro y brindará una mayor seguridad en los trabajos a realizar.



## ***Bibliografía***

- JORDAN , W** Tratado General de Topografía  
Ediciones G. Gili S.A. – México, 1981
- D' ALVIA Antonio L.** Cálculo de Compensación  
Centro de Estudiantes de Ingeniería de la UNLP,  
2001
- MINGO Oscar R.** Cálculo de Compensación  
**BASUALDO Eduardo** Consejo Profesional de Agrimensura (J.N.)
- COTLAR Mischa** Introducción al Álgebra  
**RATTO de SADOSKY Cora** Eudeba, 1977



# ANEXO I





# **PLANILLAS CON LOS DATOS ORIGINALES DE LA RED ANTIGUA**



**PUNTO FIOS DEL PARTIDO DE ITUZAINGO**

| P.F.  | UBICACION   | COTA   | OBSERVACIONES                  | CATASTRO  |
|-------|---|--------|--------------------------------|-----------|
| G.054 | M. Herrera 04 esq. Santa Rosa ✓                       | 24.401 |                                | V-K- 50   |
| G.062 | Avda. Rivadavia 21308 e/Blas Parera y Goniensora ✓    | 26.966 |                                | II-C- 153 |
| G.083 | Avda. Rivadavia 21600 e/ Masferrer y Goniensora ✓     | 27.134 |                                | II-C- 159 |
| G.084 | Juncal 393 esq. Lavalle ✓                             | 27.065 |                                | V-E- 458  |
| G.085 | Trole (Marmol) 703 e/Juncal(Necochea) y Las Heras ✓   | 27.224 |                                | V-E- 411  |
| G.086 | Quezada 673 e/Juncal (Necochea) y Camacua ✓           | 27.001 |                                | V-D- 368a |
| G.088 | Olavarría 707 e/Trole e Indio ✓                       | 26.011 |                                | V-E- 315  |
| G.089 | M. Paz 366 e/Olavarría y Baseses. ✓                   | 26.889 |                                | V-E- 493  |
| G.090 | Defilippi (Montevideo) 1219 e/Artigas y Chilaveri ✓   | 26.762 |                                | V-D- 331  |
| G.091 | Lavalleja 598 e/Soriano y Florida ✓                   | 26.621 |                                | V-D- 312  |
| G.092 | M. Paz 805 e/Serrano 1102 y Gral. J.G. De Artigas ✓   | 26.270 |                                | V-D- 337  |
| G.093 | M. Paz e/Barcaia y Posta de Parqo ✓                   | 25.737 | Pie Izquierdo de refugio       | V-L- 18   |
| G.094 | Rivadavia 21994 esq. Arengreen ✓                      | 28.170 |                                | II-C- 197 |
| G.095 | Rivadavia 22406 e/Ituzaingo y Cnel. Cortina ✓         | 27.357 |                                | II-D- 231 |
| G.096 | Rivadavia 22802 e/ M. Rodriguez y Toro ✓              | 23.564 |                                | II-D- 22a |
| G.097 | Rivadavia 23284 e/Caaguazú y Pipto ✓                  | 22.511 | Pie Izquierdo de refugio       | II-D- 263 |
| G.098 | Villegas 614 esq. Caxaravelli ✓                       | 26.621 |                                | II-D- 24a |
| G.099 | Cherment 1984 e/Aquino y El Todo ✓                    | 26.479 |                                | II-D- 273 |
| G.100 | Aquino 621 e/Pacheco y Quinquela Martin ✓             | 29.178 | ex 1521                        | II-H- 4   |
| G.101 | Aquino 1503 esq. Cafarata ✓                           | 29.179 | ex 1903                        | II-H- 82  |
| G.102 | Aquino F.L. Beltrán 1995 y Narbonolo ✓                | 29.386 |                                | II-H- 78  |
| G.107 | Alegre 598 esq. Pacheco ✓                             | 28.367 |                                | II-C- 223 |
| G.167 | P. Quintana (ex 30 de Agosto) 718 e/Trole y Alberti ✓ | 27.738 |                                | V-F- 107  |
| G.168 | P. Quintana 1125 e/Carabobo y Venezuela ✓             | 26.599 | frente local                   | V-F- 489  |
| G.169 | Proussac esq. Rivera 1405 ✓                           | 26.580 | y Anchiorena                   | V-F- 141  |
| G.170 | Benador e/Caracas 2419 y Pardo ✓                      | 21.478 | Caracas= Republica Sudafricana | V-G- 589  |
| G.232 | Ratti 297 e/Olavarría y Gral. Mansilla ✓              | 27.546 |                                | V-E- 463  |
| G.233 | Lavalle 1001 esq. Frigio ✓                            | 27.459 |                                | V-E- 443  |
| G.234 | Trole e/ Brandsen 651 y Pirin ✓                       | 27.001 |                                | V-E- 407a |
| G.235 | Brandsen 1203 esq. Carabobo ✓                         | 27.414 |                                | V-D- 274  |
| G.236 | Brandsen S/N e/Cnel. Barcaia y De La Cruz ✓           | 26.589 |                                | V-D- 11h  |
| G.237 | Brandsen S/N e/ S. Dumont y La Prada ✓                | 24.874 |                                | V-L- 122  |
| G.238 | Brandsen esq. Belén ✓                                 | 24.976 |                                | V-L- 133  |
| G.239 | Brandsen 2899 esq. Pringles ✓                         | 23.868 | y Aguaribay                    | V-L- 115  |



P. F. G. ITUZAINGO

**PINOS HIJOS DEL PARTIDO DE ITUZAINGO**

| P.F.  | UBICACION  | COTA   | OBSERVACIONES                 | CATASTRO     |
|-------|--|--------|-------------------------------|--------------|
| G.240 | Branden e/Cerrito y Ayolas                             | 21.887 |                               | V-II-592a    |
| G.241 | Branden esq. Fanatina (ex Romero) y Avda. Gona         | 21.043 |                               | V-II-        |
| G.242 | J.M. Paz 1787 e/S. Dumont y La Piedad                  | 25.955 |                               | V-N-80       |
| G.243 | J.M. Paz 2465 e/ Belén y Peredo                        | 26.237 |                               | V-N-71b      |
| G.244 | Avda. Gona e/La Trochilla y Del Prado                  | 17.890 |                               | IV-M-74      |
| G.245 | Martin Fierro S/N e/Del Cielino y De Los Baqueanos     | 26.298 |                               | IV-M-17      |
| G.246 | Martin Fierro e/ Thames y De La Tradición              | 13.605 | Si Cochera de N° 3935         | IV-N-74      |
| G.247 | Martin Fierro e/ Segundo Sombra y Santos Vega          | 12.097 |                               | IV-N-70      |
| G.248 | Avda. Gona e/P. Leoir y Jacarandá                      | 24.869 |                               | IV-M-100     |
| G.250 | Cerrito e/Raiti y De La Torre                          | 19.032 |                               | V-M-10       |
| G.251 | M. Rodriguez S/N e/Cerrito y Ayolas                    | 16.298 |                               | V-M-145      |
| G.252 | Almagro S/N e/San Isidro y Pringles                    | 17.728 |                               | V-M-152      |
| G.253 | Almagro S/N e/Aguaribay y Austria                      | 22.145 |                               | V-M-182      |
| G.254 | Panaghi s/n e/Turquia y Holanda                        | 24.587 |                               | V-G-606      |
| G.255 | Posta de Pardo 3354 e/Acevedo y Costa Rica             | 19.150 |                               | V-D-469      |
| G.256 | Ratti e/Fco. de La Cruz y Barcala                      | 26.065 |                               | V-J-32a      |
| G.257 | Fanatina e/Acevedo y Colombia                          | 13.825 |                               | V-rural 673a |
| G.258 | Fanatina esq. Tel Aviv                                 | 12.892 |                               | IV-N-        |
| G.259 | Martin Fierro S/N e/Junta de Mayo y Sanluisdel         | 10.800 | Exprop. por C.A.M.S.E         | IV-N-80b     |
| G.260 | A. Scruabi S/N e/Martin Fierro y Garcia Lorca          | 10.842 |                               | V-K-1        |
| G.261 | Avda. Gona y Barcala                                   | 25.446 | Exprop. por Obras Gona        | IV-F-76      |
| G.262 | Avda. Gona 6533 e/Las Cabañas y Filipinas              | 24.813 | Exprop. por Obras Gona        | IV-F-61      |
| G.266 | Udaondo 841 e/De La Carreta y F. Leoir                 | 24.016 | Pie Izq. del Portal           | IV-M-32      |
| G.267 | Udaondo e/La vidalita y De Los reseros                 | 17.979 | Sipilar de Luz                | IV-M-2       |
| G.268 | Udaondo esq. De Los Baqueanos                          | 16.716 | De Los Payadores Pie Izq. de  | IV-F-frac3   |
| G.269 | De La Tradición s/n e/J. Balbin y Udaondo              | 12.985 | Frente tel-público            | IV-F-49      |
| G.270 | J. Balbin S/N e/ Del Pretal y Del Gato                 | 11.810 | Frente Refugio esq del Pretal | IV-F-20      |
| G.271 | J. Balbin 4727 e/Del Cabestro y Mansilla               | 10.562 | Pilar de Luz                  | V-D-314      |
| G.290 | Lavaileja 302 esq. Colonia                             | 26.467 |                               | II-C-200     |
| G.291 | Los Pozos 377 e/Laguina y Clerment                     | 27.572 |                               | II-C-217     |
| G.292 | Alegre 854 e/Arengreen y Tomás Espora                  | 28.181 |                               | V-D-379      |
| G.295 | Barcala s/n e/Lavaileja y Oribe                        | 24.180 |                               | V-N-12       |
| G.296 | Barcala 2151 e/Muñiz y Haro                            | 24.797 | En el pilar                   | V-D-394      |
| G.297 | V. uniz 632 e/(Darragueira)(Fleming) y Pio Collivadino | 26.444 |                               |              |

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Página 2





| PUNTO Nº 105 - BARRIO DE BURNINGHAM |  | CATASTRO |                             |
|-------------------------------------|--|----------|-----------------------------|
| Nº P.F.                             | UBICACION  | COTA     | OBSERVACIONES               |
| G.263                               | Las Cabañas s/n e/Don Cristóbal y Padre Cherasco | 25.168   | Lado Hurlingham             |
| G.264                               | Las Cabañas s/n e/Vernjua y Los Azuleos          | 25.447   | Lado Hurlingham             |
| G.265                               | Las Cabañas s/n e/F. Leleir y De La Carreta      | 22.095   | Lado Ituzaingó              |
| Relevados entre el 2 y el 17/10/95  |  |          |                             |
| PUNTO Nº 106 - BARRIO DE MORÓN      |  | CATASTRO |                             |
| Nº P.F.                             | DIRECCION  | COTA     | OBSERVACIONES               |
| G.047                               | Santa Rosa 1201 esq. Arredondo                   | 25.575   | Y M. de Loreto Lado Morón   |
| G.052                               | Santa Rosa 1597 e/Cne. Rauch y Sarmiento         | 26.731   | Lado Morón                  |
| G.055                               | Santa Rosa 2534 e/Viantronte Y Curuchel          | 25.265   | Exp. por Obras de Av. Gaona |
| G.063                               | Blas Parera 591 e/Buñano y Araoz                 | 26.911   | Lado Morón                  |
| G.064                               | Blas Parera 802 esq. Arena                       | 26.378   | Y M. Burucuyá Lado Morón    |
| G.065                               | Blas Parera 1148 e/Martin Coronado y Ortuzar     | 28.122   | Lado Morón                  |
| G.066                               | Blas Parera 1925 e/Villegas y Aquino             | 29.076   | Lado Ituzaingó              |
| G.067                               | Santa Rosa 319 e/Campichuelo y Sarachaga         | 24.665   | Lado Morón                  |
| G.103                               | Blas Parera e/Fray Luis Beltrán y Cnel. N. Vega  | 28.857   | Lado Ituzaingó              |
| Relevados entre el 2 y el 17/10/95. |  |          |                             |
| PUNTO Nº 107 - BARRIO DE MERLO      |  | CATASTRO |                             |
| Nº P.F.                             | DIRECCION  | COTA     | OBSERVACIONES               |
| G.067                               | Hortiguera Nº 451                                | 23.205   | Lado Merlo                  |
| G.068                               | Hortiguera Nº 302                                | 22.574   | Lado Ituzaingó              |
| G.069                               | Hortiguera Nº 694                                | 28.959   | Lado Ituzaingó              |
| G.070                               | Hortiguera Nº                                    | 27.955   | Lado Merlo                  |
| G.071                               | Hortiguera Nº 1587                               | 29.482   | Lado Merlo                  |

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## **PLANILLAS RESUMEN PARA VOLCAR LOS DATOS FINALES DEL TRABAJO**



| UNICIPALIDAD DE ITUZAINGO |       |       |      |        | Provincia: BUENOS AIRES |           |       |       |      | HOJA : 01                |                     |                                |              |   |
|---------------------------|-------|-------|------|--------|-------------------------|-----------|-------|-------|------|--------------------------|---------------------|--------------------------------|--------------|---|
|                           |       |       |      |        |                         |           |       |       |      | PLANO DE REFERENCIA: IGM |                     |                                | TOTAL :      |   |
| PUNTO FIJO                |       |       |      |        | Caract. Del             | UBICACIÓN |       |       |      |                          |                     |                                | a mts. De la | Observaciones   |
| Caract.                   | Repar | Nomen | COTA | Altura | Suelo                   | Circ.     | Secc. | Chac. | Qta. | Manz.                    | Calle y N°          | Entre calle..... y calle ..... | 1ª calle     |   |
| Ménsula                   | D.G   | 064   |      | 0.87   | Cemento                 |           |       |       |      |                          | Blas Parera N° 802  | Cnel. Arena y Mburucuya        | 0.32         | De la ochava - Lado MORON<br>Lado MORON<br>Hay 2 casas con el N° 1925 |
| "                         | D.G   | 065   |      | 0.80   | Baldosón                |           |       |       |      |                          | Blas Parera N° 1148 | M. Coronado y Ortuzar          |              |   |
| "                         | D.G   | 066   |      | 0.75   | Cemento                 |           |       |       |      |                          | Blas Parera N° 1925 | P. Aquino y Gral. Villegas     |              |   |
| PROF. RESPONSABLE:        |       |       |      |        | LEVANTAMIENTO:          |           |       |       |      | FECHA:                   |                     |                                |              |   |



## Proyecto de Ordenanza Municipal

Art. 1° - Apruebanse las tareas que se realizan en el ámbito municipal para la construcción de la NUEVA RED ALTIMETRICA y declarase de interés publico la colocación de ménsulas en los frentes de las construcciones ubicadas en todo el ejido municipal.

Art. 2° - Establecese que es obligación de los frentistas permitir la colocación de las chapas de referencia o mensuras en la fachada de los inmuebles que indique el personal municipal o quines estos designen para realizar la tarea.

Art. 3° - Establecese que en caso de modificación o reparación del frente afectado por la red, el propietario deberá notificar a la Municipalidad de Ituzaingo a fin de que se tomen los recaudos necesarios para su conservación, quedando a cargo de esta los gastos que demande dicha operación.

Art. 4° - Establecese asimismo que la modificación, destrucción, o cualquier otro acto que atente contra las referencias instaladas para materializar los niveles e impidan el cumplimiento efectivo de sus fines, reviste el carácter de falta grave municipal, haciendo pasible al contraventor de las sanciones previstas en el Código de Faltas Municipal.

Art. 5 – Comuníquese, etc ..



# ANEXO II





## Polígono de prueba

Se midió un polígono al solo efecto de comprobar la metodología propuesta y estimar los rendimientos para la elaboración de un presupuesto aproximado para la realización del trabajo. Este polígono no coincide con ninguno de los propuestos en el proyecto porque estos últimos están integrados con puntos fijos existentes y nuevos a instalar.

Este polígono quedó conformado por la mensulas de la red antigua de Geodesia **G 167, G 232, G 233, G 084, G 087, G094, G095**, mas una ménsula perteneciente a la red de ex Obras Sanitarias de la Nación **OSN 18** y un punto fijo auxiliar. La longitud total del mismo es de aproximadamente 5,3 Km. De tal manera que tiene características similares a las de los polígonos propuestos en el proyecto.

Para las tareas de nivelación se utilizó un nivel marca Wild (Leica), modelo NAK2 de 32 aumentos. Se utilizaron miras centimetradas de aluminio, verticalizadas con niveles esféricos y sapos para el apoyo de las mismas en los puntos de paso, en el cuadro siguiente se presentan los resultados de este trabajo.

| P.F.                             | Distancia<br>Km) | Desnivel (mm)                               |        |          |
|----------------------------------|------------------|---|--------|----------|
|                                  |                  | IDA   | VUELTA | Promedio |
| G 232                            | .....            | .....                                       | .....  | .....    |
| G 233                            | 0,400            | -0,137                                      | 0,134  | -0,136   |
| G 084                            | 0,420            | -0,364                                      | 0,359  | -0,362   |
| G 087                            | 0,700            | -2,401                                      | 2,402  | -2,402   |
| PF AUX.                          | 0,430            | 1,421                                       | -1,422 | 1,422    |
| G 094                            | 0,910            | 2,094                                       | -2,101 | 2,098    |
| G 095                            | 0,500            | -0,793                                      | 0,790  | -0,792   |
| OSN 18                           | 0,450            | -3,189                                      | 3,186  | -3,188   |
| G 167                            | 0,650            | 3,562                                       | -3,560 | 3,561    |
| G 232                            | 0,900            | -0,203                                      | 0,197  | -0,200   |
| <b>Longitud polígono = 5,360</b> |                  | <b>Error de cierre del poligono = 0,003</b> |        |          |

La medición se realizó en un tiempo de siete horas, por tal motivo se estima que podría adoptarse un rendimiento de 4,5 km por día



En el análisis de los resultados obtenidos, resulta que se pueden observar algunas diferencia en los valores entre los valores de los desniveles medidos y aquellos que obtenemos de cálculos con los valores de cota proporcionados por la Municipalidad de Ituzaingo. Estas diferencia van desde valores razonables de 8 milímetros hasta valores inadmisibles de 59 milímetros para un tramo de aproximadamente 400 metros. Esto se refleja en el cuadro siguiente

| P.F.  | Desnivel medido (mm) |        |          | Desnivel | Diferencia    |
|-------|----------------------|--------|----------|----------|---------------|
|       | IDA                  | VUELTA | Promedio | Geodesia |               |
| G 232 | .....                | .....  | .....    |          |               |
| G 233 | -0,137               | 0,134  | -0,136   | -0,077   | <b>-0,059</b> |
| G 084 | -0,364               | 0,359  | -0,362   | -0,402   | <b>0,041</b>  |
| G 087 | -2,401               | 2,402  | -2,402   | -2,400   | <b>-0,001</b> |
|       |                      |        |          |          |               |
| G 094 | 2,094                | -2,101 |          |          |               |
| G 095 | -0,793               | 0,790  | -0,792   | -0,813   | <b>0,022</b>  |
|       | -3,189               | 3,186  |          |          |               |
| G 167 | 3,562                | -3,560 |          |          |               |
| G 232 | -0,203               | 0,197  | -0,200   | -0,192   | <b>-0,008</b> |

En esta pequeña muestra encontramos una razón mas para ver la necesidad de proceder a una actualización de la red altimétrica existente.



# **ANEXO III**

# **PLANOS**