

1.- Calcular las coordenadas de los vértices, dados los datos siguientes:

$$\begin{aligned}\theta_1 &= 90^\circ 55' 15'' & D_{12} &= 121,60 \text{ m.} \\ \theta_2 &= 83^\circ 04' 43'' & D_{23} &= 119,85 \text{ m.} \\ \theta_3 &= 101^\circ 40' 46'' & D_{34} &= 109,46 \text{ m.} \\ \theta_4 &= 84^\circ 19' 12'' & D_{41} &= 125,58 \text{ m.} \\ AZ_{12} &= 100^\circ \\ X_1 &= 1000, Y_1 = 1000\end{aligned}$$

RESOLUCIÓN:

Suma de ángulos internos:

$$90^\circ 55' 15'' + 83^\circ 4' 43'' + 101^\circ 40' 46'' + 84^\circ 19' 12'' = 359^\circ 59' 56'' = 359^\circ 59' 56''$$

Ángulos corregidos:

$$\begin{aligned}90^\circ 55' 16'' \\ 83^\circ 4' 44'' \\ 101^\circ 40' 47'' \\ 84^\circ 19' 13''\end{aligned}$$

Cálculo de acimutes:

$$\begin{aligned}AZ_{23} &= 100^\circ + 83^\circ 04' 44'' - 180^\circ = 3^\circ 04' 44'' \\ AZ_{34} &= 3^\circ 04' 44'' + 101^\circ 40' 47'' + 180^\circ = 284^\circ 45' 31'' \\ AZ_{41} &= 284^\circ 45' 31'' + 84^\circ 19' 13'' - 180^\circ = 189^\circ 04' 44'' \\ AZ_{12} &= 189^\circ 04' 44'' + 90^\circ 55' 16'' - 180^\circ = 100^\circ\end{aligned}$$

$$\begin{aligned}\Delta N_{12} &= 121,60 \cdot \cos(100^\circ 00' 00'') = -21,12 \text{ m.} \\ \Delta N_{23} &= 119,85 \cdot \cos(003^\circ 04' 44'') = 119,68 \text{ m.} \\ \Delta N_{34} &= 109,46 \cdot \cos(284^\circ 45' 31'') = 27,88 \text{ m.} \\ \Delta N_{41} &= 125,58 \cdot \cos(189^\circ 04' 44'') = 124,01 \text{ m.}\end{aligned}$$

$$\Sigma = +2,43 \text{ m.}$$

$$\text{Corrección} = -2,43 \text{ m.}$$

$\Delta N$  corregidos:

$$\begin{aligned}\Delta N_{12} &= -21,12 + (2,43/476,49) \cdot 121,60 = -21,74 \text{ m.} \\ \Delta N_{23} &= 119,68 + (2,43/476,49) \cdot 119,85 = 119,07 \text{ m.} \\ \Delta N_{34} &= 27,88 + (2,43/476,49) \cdot 109,46 = 27,32 \text{ m.} \\ \Delta N_{41} &= 124,58 + (2,43/476,49) \cdot 124,01 = 124,65 \text{ m.}\end{aligned}$$

$$N_2 = 1000 + (-21,74) = 978,26 \text{ m.}$$

$$N_3 = 978,26 + 119,07 = 1097,33 \text{ m.}$$

$$N_4 = 1097,33 + 27,32 = 1124,65 \text{ m.}$$

$$\begin{aligned}\Delta E_{12} &= 121,60 \cdot \cos(100^\circ 00' 00'') = 119,75 \text{ m.} \\ \Delta E_{23} &= 119,85 \cdot \cos(003^\circ 04' 44'') = 6,44 \text{ m.} \\ \Delta E_{34} &= 109,46 \cdot \cos(284^\circ 45' 31'') = -105,85 \text{ m.} \\ \Delta E_{41} &= 125,58 \cdot \cos(189^\circ 04' 44'') = -19,82 \text{ m.}\end{aligned}$$

$$\Sigma = +0,52 \text{ m.}$$

$$\text{Corrección} = -0,52 \text{ m.}$$

$\Delta E$ Corregidos:

$$\Delta E_{12} = 119,75 + (0,52/476,49)*121,60 = 119,62 \text{ m.}$$

$$\Delta E_{23} = 119,68 + (0,52/476,49)*119,85 = 6,31 \text{ m.}$$

$$\Delta E_{34} = 27,88 + (0,52/476,49)*109,46 = -105,97 \text{ m.}$$

$$\Delta E_{41} = 124,58 + (0,52/476,49)*124,01 = -19,96 \text{ m.}$$

$$E_2 = 1000 + 119,62 = 1119,62 \text{ m.}$$

$$E_3 = 1119,62 + 6,31 = 1125,93 \text{ m.}$$

$$E_4 = 1125,93 + (-105,97) = 1019,96 \text{ m.}$$

1'.- Calcular las coordenadas de los vértices, dados los datos siguientes:

$$\theta_1 = 76^\circ 0' 3''$$

$$D_{12} = 176,80 \text{ m.}$$

$$\theta_2 = 100^\circ 59' 58''$$

$$D_{23} = 133,57 \text{ m.}$$

$$\theta_3 = 103^\circ 0' 4''$$

$$D_{34} = 166,58 \text{ m.}$$

$$\theta_4 = 79^\circ 59' 59''$$

$$D_{41} = 203,00 \text{ m.}$$

$$AZ_{12} = 100^\circ$$

$$X_1 = 1000, Y_1 = 1000$$

RESOLUCIÓN:

Suma de ángulos internos:

$$76^\circ 0' 3'' + 100^\circ 59' 58'' + 103^\circ 0' 4'' + 79^\circ 59' 59'' = 360^\circ 0' 4''$$

4'' de exceso; corrección = 1'' por ángulo.

Ángulos corregidos:

$$\theta_1 = 76^\circ 0' 2''$$

$$\theta_2 = 100^\circ 59' 57''$$

$$\theta_3 = 103^\circ 0' 3''$$

$$\theta_4 = 79^\circ 59' 58''$$

Cálculo de acimutes:

$$AZ_{23} = 100^\circ + 100^\circ 59' 57'' - 180^\circ = 20^\circ 59' 57''$$

$$AZ_{34} = 20^\circ 59' 57'' + 103^\circ 0' 3'' + 180^\circ = 304^\circ 0' 0''$$

$$AZ_{41} = 304^\circ 0' 0'' + 79^\circ 59' 58'' - 180^\circ = 203^\circ 59' 58''$$

$$\Delta N_{12} = 176,80 * \cos(100^\circ 00' 00'') = -30,70 \text{ m.}$$

$$\Delta N_{23} = 133,57 * \cos(20^\circ 59' 57'') = 124,70 \text{ m.}$$

$$\Delta N_{34} = 166,58 * \cos(304^\circ 0' 0'') = 93,15 \text{ m.}$$

$$\Delta N_{41} = 203,00 * \cos(203^\circ 59' 58'') = -185,45 \text{ m.}$$

$$\Sigma = +1,7 \text{ m.}$$

$$\text{Corrección} = -1,7 \text{ m.}$$

$\Delta N$ corregidos:

$$\Delta N_{12} = -30,70 + (-1,7/679,95)*176,80 = -31,14 \text{ m.}$$

$$\Delta N_{23} = 124,70 + (-1,7/679,95)*133,57 = 124,37 \text{ m.}$$

$$\Delta N_{34} = 93,15 + (-1,7/679,95)*166,58 = 92,73 \text{ m.}$$

$$\Delta N_{41} = -185,45 + (-1,7/679,95)*203,00 = -185,96 \text{ m.}$$

$$N_2 = 1000 + (-31,14) = 968,86 \text{ m.}$$

$$N_3 = 978,26 + 119,07 = 1093,23 \text{ m.}$$

$$N_4 = 1097,33 + 27,32 = 1185,96 \text{ m.}$$

$$\Delta E_{12} = 176,80*\text{sen}(100^\circ 00' 00'') = 174,11 \text{ m.}$$

$$\Delta E_{23} = 133,57*\text{sen}(20^\circ 59' 57'') = 47,86 \text{ m.}$$

$$\Delta E_{34} = 166,58*\text{sen}(304^\circ 0' 0'') = -138,10 \text{ m.}$$

$$\Delta E_{41} = 203,00*\text{sen}(203^\circ 59' 58'') = -82,57 \text{ m.}$$

$$\Sigma = +1,3\text{m.}$$

$$\text{Corrección} = -1,3 \text{ m.}$$

$\Delta E$ Corregidos:

$$\Delta N_{12} = 174,11 + (-1,3/679,95)*176,80 = 173,77 \text{ m.}$$

$$\Delta N_{23} = 47,86 + (-1,3/679,95)*133,57 = 47,61 \text{ m.}$$

$$\Delta N_{34} = -138,10 + (-1,3/679,95)*166,58 = -138,42 \text{ m.}$$

$$\Delta N_{41} = -82,57 + (-1,3/679,95)*203,00 = -82,96 \text{ m.}$$

$$E_2 = 1000 + 173,77 = 1173,77 \text{ m.}$$

$$E_3 = 1173,77 + 47,61 = 1221,38 \text{ m.}$$

$$E_4 = 1221,38 + (-138,42) = 1082,96 \text{ m.}$$