$V = \begin{bmatrix} V_1 \\ \vdots \\ V_n \end{bmatrix}$ $d = \begin{bmatrix} d_1 \\ \vdots \\ d_n \end{bmatrix}$ $Y = \begin{bmatrix} Y_{11} & Y_{12} & Y_{13} & Y_{14} \cdots \\ Y_{21} & Y_{22} & Y_{23} & Y_{24} \cdots \\ Y_{31} & Y_{32} & Y_{33} & Y_{34} \cdots \\ \vdots & \vdots & \vdots & \end{bmatrix}_{n \times n}$

$PG_i - PL_i = \underbrace{V_i^2 Y_{ii} \cos\theta_{ii}}_{A_i} + \underbrace{\sum_{\substack{j=1 \\ j \neq i}}^{n} V_i V_j Y_{ij} \cos(d_i - d_j - \theta_{ij})}_{B_i \quad C_i}$

Outer Product

$V \times V = \begin{bmatrix} V_1V_1 & V_1V_2 & V_1V_3 & V_1V_4 \cdots \\ V_2V_1 & V_2V_2 & V_2V_3 & V_2V_4 \cdots \\ V_3V_1 & V_3V_2 & V_3V_3 & V_3V_4 \cdots \\ V_4V_1 & V_4V_2 & V_4V_3 & V_4V_4 \cdots \\ \vdots & & & \end{bmatrix}_{n \times n}$ $V \ominus V = \begin{bmatrix} V_1 - V_1 & V_1 - V_2 & V_1 - V_3 & V_1 - V_4 \cdots \\ V_2 - V_1 & V_2 - V_2 & V_2 - V_3 & V_2 - V_4 \cdots \\ V_3 - V_1 & V_3 - V_2 & V_3 - V_3 & V_3 - V_4 \cdots \\ V_4 - V_1 & V_4 - V_2 & V_4 - V_3 & V_4 - V_4 \cdots \\ \vdots & & & \end{bmatrix}_{n \times n}$

$V \times V \otimes Y = \begin{bmatrix} V_1V_1Y_{11} & V_1V_2Y_{12} & V_1V_3Y_{13} \cdots \\ V_2V_1Y_{21} & V_2V_2Y_{22} & V_2V_3Y_{23} \cdots \\ V_3V_1Y_{31} & V_3V_2Y_{32} & V_3V_3Y_{33} \cdots \\ V_4V_1Y_{41} & V_4V_2Y_{42} & V_4V_3Y_{43} \cdots \\ \vdots & & \end{bmatrix}$ (I)

$(V \times V \otimes Y)$

$\cos(d \ominus d - \theta) = \begin{bmatrix} \cos(d_1 - d_1 - \theta_{11}) & \cos(d_1 - d_2 - \theta_{12}) & \cos(d_1 - d_3 - \theta_{13}) & \cos(d_1 - d_4 - \theta_{14}) \cdots \\ \cos(d_2 - d_1 - \theta_{21}) & \cos(d_2 - d_2 - \theta_{22}) & \cos(d_2 - d_3 - \theta_{23}) & \cos(d_2 - d_4 - \theta_{24}) \cdots \\ \cos(d_3 - d_1 - \theta_{31}) & \cos(d_3 - d_2 - \theta_{32}) & \cos(d_3 - d_3 - \theta_{33}) & \cos(d_3 - d_4 - \theta_{34}) \cdots \\ \vdots & \vdots & \vdots & \vdots \end{bmatrix}$ (II)

The elements on the diagonal are:

$\cos(\theta_{11}) \quad \cos(\theta_{22}) \cdots \cos(\theta_{nn})$

$V_1^2 \quad V_2^2 \cdots V_2^2$

Corresponding to B

$B * C = \text{diag}\left((V \times V \times_{II} Y) \cos(d \ominus d - \theta)^T \right)$ *