ΜΕΘΟΔΟΣ ΑΠΑΛΟΙΦΗΣ GAUSS: Εφαρμόζω με τη σειρά $k = 1, 2, \ldots, n-1$: $u_{kj}^{(k)} = \dfrac{y_{kj}^{(k-1)}}{y_{kk}^{(k-1)}}$ για $j = k+1, \ldots, n$ και

$V_k'^{(k)} = \dfrac{1}{y_{kk}^{(k-1)}} I_k^{(k-1)}$, $\quad y_{ij}^{(k)} = y_{ij}^{(k-1)} - \dfrac{y_{ik}^{(k-1)} y_{kj}^{(k-1)}}{y_{kk}^{(k-1)}} = y_{ij}^{(k-1)} - y_{ik}^{(k-1)} u_{kj}^{(k)}$, $\quad I_i^{(k)} = I_i^{(k-1)} - \dfrac{y_{ik}^{(k-1)}}{y_{kk}^{(k-1)}} I_k^{(k-1)} = I_i^{(k-1)} - y_{ik}^{(k-1)} V_k'^{(k)}$

για $i, j = k+1, \ldots, n$. Για $k = n$ υπολογίζω μόνο $V_k'^{(k)} = \dfrac{1}{y_{kk}^{(k-1)}} I_k^{(k-1)}$

KRON: $\displaystyle\sum_{\substack{j=1 \\ j \neq p}}^{n} \left(y_{ij} - \frac{y_{ip} y_{pj}}{y_{pp}} \right) V_j = I_i$, $\quad y_{ij}^{(new)} = y_{ij} - \dfrac{y_{ip} y_{pj}}{y_{pp}}$ για $i, j = 1, \ldots, n \quad i, j \neq p$

ΑΡΦ: $S_{Gi} - S_{Li} = V_i \left(\sum_{j=1}^{n} y_{ij} V_j\right)^*$ $\quad P_i - jQ_i = V_i^* \left(\sum_{j=1}^{n} y_{ij} V_j\right)$, όπου $P_i = P_{Gi} - P_{Li}$ και $Q_i = Q_{Gi} - Q_{Li}$

$$V_i^{(\nu+1)} = \frac{1}{y_{ii}} \left[\frac{P_i - jQ_i}{\left(V_i^{(\nu)}\right)^*} - \sum_{j=1}^{i-1} y_{ij} V_j^{(\nu+1)} - \sum_{j=i+1}^{n} y_{ij} V_j^{(\nu)} \right] \qquad i = 2,\ 3\ ,\ldots\ ,\ n$$

$$Q_i^{(\nu+1)} = -|V_i|_{spec} \left[\sum_{j=1}^{i-1} |V_j|^{(\nu+1)} |y_{ij}| \sin(\delta_j^{(\nu+1)} - \delta_i^{(\nu)} + \gamma_{ij}) + \sum_{j=i}^{n} |V_j|^{(\nu)} |y_{ij}| \sin(\delta_j^{(\nu)} - \delta_i^{(\nu)} + \gamma_{ij}) \right]$$

$$P_i = P_{Gi} - P_{Li} = \sum_{j=1}^{n} |V_i||V_j||y_{ij}| \cos(\delta_j - \delta_i + \gamma_{ij}) \qquad Q_i = Q_{Gi} - Q_{Li} = -\sum_{j=1}^{n} |V_i||V_j||y_{ij}| \sin(\delta_j - \delta_i + \gamma_{ij})$$

$$\sum_{i=1}^{n} P_{Gi} = \sum_{i=1}^{n} P_{Li} + \sum_{i=1}^{n} \left[\sum_{j=1}^{n} |V_i||V_j||y_{ij}| \cos(\delta_j - \delta_i + \gamma_{ij}) \right] \qquad \sum_{i=1}^{n} Q_{Gi} = \sum_{i=1}^{n} Q_{Li} + \sum_{i=1}^{n} \left[-\sum_{j=1}^{n} |V_i||V_j||y_{ij}| \sin(\delta_j - \delta_i + \gamma_{ij}) \right]$$

$$\begin{bmatrix} \Delta P \\ \Delta Q \end{bmatrix} = \begin{bmatrix} H & N \\ M & L \end{bmatrix} \begin{bmatrix} \Delta\delta \\ \Delta|V| \end{bmatrix}$$

$\sin(\alpha+\beta) = \sin\alpha \cdot \cos\beta + \sin\beta \cdot \cos\alpha$

$$H_{ij} = \left(\frac{\partial P_i}{\partial \delta_j}\right) = -|V_i||V_j||y_{ij}| \sin(\delta_j - \delta_i + \gamma_{ij}) \quad i \neq j \qquad M_{ij} = \left(\frac{\partial Q_i}{\partial \delta_j}\right) = -|V_i||V_j||y_{ij}| \cos(\delta_j - \delta_i + \gamma_{ij}) \quad i \neq j$$

$$H_{ii} = \left(\frac{\partial P_i}{\partial \delta_i}\right) = \sum_{\substack{j=1 \\ j \neq i}}^{n} |V_i||V_j||y_{ij}| \sin(\delta_j - \delta_i + \gamma_{ij}) = \sum_{j=1}^{n} |V_i||V_j||y_{ij}| \sin(\delta_j - \delta_i + \gamma_{ij}) - |V_i|^2 |y_{ii}| \sin\gamma_{ii} = -Q_i - |V_i|^2 b_{ii}$$

$$M_{ii} = \left(\frac{\partial Q_i}{\partial \delta_i}\right) = \sum_{\substack{j=1 \\ j \neq i}}^{n} |V_i||V_j||y_{ij}| \cos(\delta_j - \delta_i + \gamma_{ij}) = \sum_{j=1}^{n} |V_i||V_j||y_{ij}| \cos(\delta_j - \delta_i + \gamma_{ij}) - |V_i|^2 |y_{ii}| \cos\gamma_{ii} = P_i - |V_i|^2 g_{ii}$$

$$N_{ij} = \left(\frac{\partial P_i}{\partial |V_j|}\right) = |V_i||y_{ij}| \cos(\delta_j - \delta_i + \gamma_{ij}) = -\frac{M_{ij}}{|V_j|} \quad i \neq j \qquad L_{ij} = \left(\frac{\partial Q_i}{\partial |V_j|}\right) = -|V_i||y_{ij}| \sin(\delta_j - \delta_i + \gamma_{ij}) = \frac{H_{ij}}{|V_j|} \quad i \neq j$$

$$N_{ii} = \left(\frac{\partial P_i}{\partial |V_i|}\right) = 2|V_i||y_{ii}| \cos\gamma_{ii} + \sum_{\substack{j=1 \\ j \neq i}}^{n} |V_j||y_{ij}| \cos(\delta_j - \delta_i + \gamma_{ij}) = \sum_{j=1}^{n} |V_j||y_{ij}| \cos(\delta_j - \delta_i + \gamma_{ij}) + |V_i||y_{ii}| \cos\gamma_{ii} = \frac{P_i}{|V_i|} + |V_i| g_{ii}$$

$$L_{ii} = \left(\frac{\partial Q_i}{\partial |V_i|}\right) = -2|V_i||y_{ii}| \sin\gamma_{ii} - \sum_{\substack{j=1 \\ j \neq i}}^{n} |V_j||y_{ij}| \sin(\delta_j - \delta_i + \gamma_{ij}) = -\sum_{j=1}^{n} |V_j||y_{ij}| \sin(\delta_j - \delta_i + \gamma_{ij}) - |V_i||y_{ii}| \sin\gamma_{ii} = \frac{Q_i}{|V_i|} - |V_i| b_{ii}$$

ΣΦΑΛΜΑΤΑ:

$\dfrac{u_r}{i_r} = \dfrac{u_1 + u_2}{i_1 + i_2} = R \qquad \dfrac{u_2}{u_1} = \dfrac{R - R_w}{R + R_w} = a_r$, όπου $R_w = \sqrt{\dfrac{L}{C}}$

Εμπειρικός συντελεστής απόσβεσης συνιστώσας ΣΡ στο χρόνο για διακόπτη: 8 κύκλων ή πιο αργός = 1.0, 5 κύκλων = 1.1, 2 κύκλων = 1.4

$$E = V_t \pm jI_L X_d \qquad E' = V_t \pm jI_L X_d' \qquad E'' = V_t \pm jI_L X_d'' \qquad I^\sigma = \frac{V_\nu^0}{Z^\sigma + Z_{\nu\nu}} \qquad V_\mu^\sigma = V_\mu^0 - \frac{Z_{\mu\nu}}{Z^\sigma + Z_{\nu\nu}} V_\nu^0$$

$$I_p = \mathrm{T} \cdot I_s \qquad \mathrm{T} = \begin{bmatrix} 1 & 1 & 1 \\ a^2 & a & 1 \\ a & a^2 & 1 \end{bmatrix} \qquad \mathrm{T}^{-1} = \frac{1}{3} \begin{bmatrix} 1 & a & a^2 \\ 1 & a^2 & a \\ 1 & 1 & 1 \end{bmatrix}$$