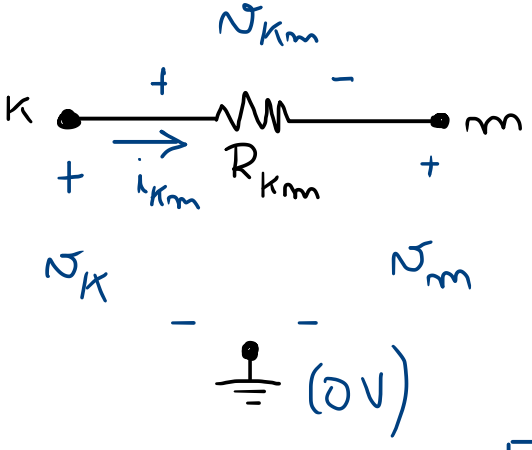
PRINCÍPIOS DA ANÁLISE NODAL

$$G = \frac{1}{R}$$

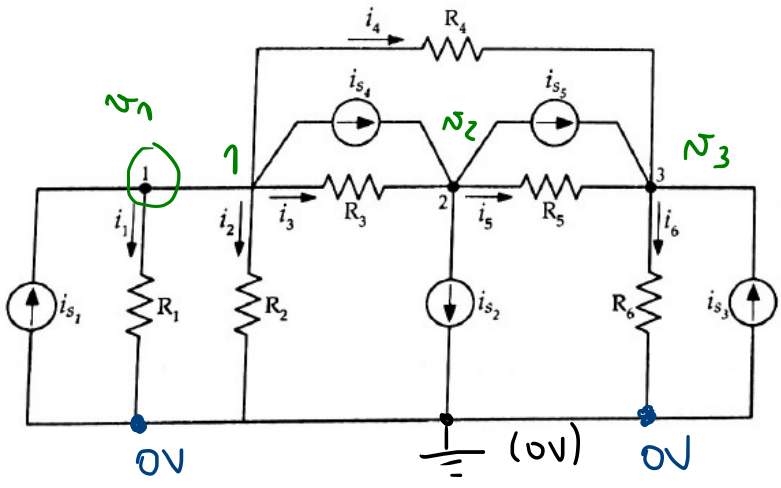


$$i_{km} = \frac{v_{km}}{R_{km}} = G_{km} \cdot v_{km}$$

$$v_{km} = v_k - v_m$$

$$i_{km} = \frac{v_k - v_m}{R_{km}}$$

$$i_{km} = G_{km}(v_k - v_m)$$



$(N-1)$ equações

↳ nós.

1:

$$i_{s_1} - i_1 - i_2 - i_3 - i_{s_4} - i_4 = 0$$

2:

$$i_{s_4} - i_{s_5} - i_{s_2} + i_3 - i_5 = 0$$

3:

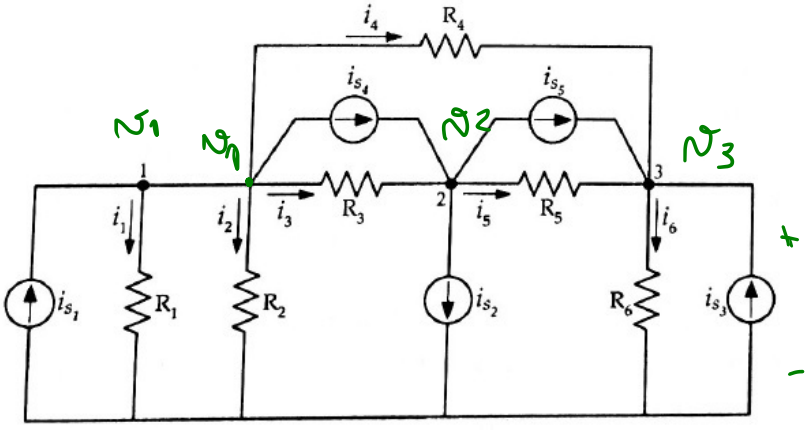
$$i_{s_3} + i_{s_5} - i_6 + i_4 + i_5 = 0$$

Em termos das Condutâncias:

$$G_1 \cdot v_1 + G_2 v_1 + G_3(v_1 - v_2) + G_4(v_1 - v_3) = i_{s_1} - i_{s_4} \quad (I)$$

$$-G_3(v_1 - v_2) + G_5(v_2 - v_3) = i_{s_4} - i_{s_5} - i_{s_2} \quad (II)$$

$$-G_4(v_1 - v_3) - G_5(v_2 - v_3) + G_6 v_3 = i_{s_3} + i_{s_5} \quad (III)$$

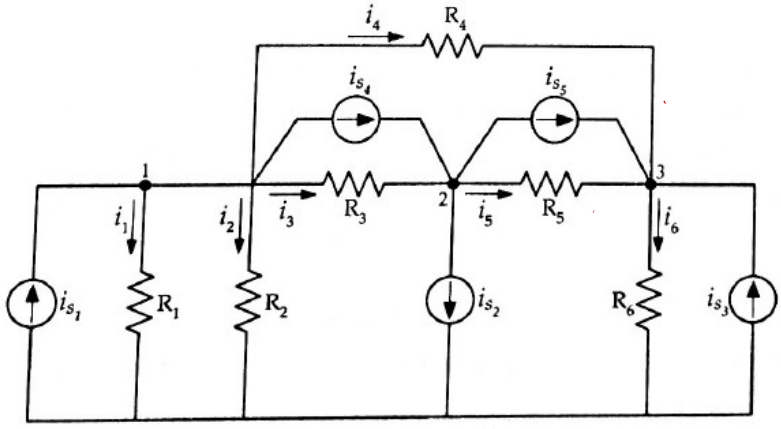


$$G \cdot V = I_S$$

$$i_1 = \frac{v_1}{R_1} = G_1 v_1$$

$$\begin{bmatrix} (G_1+G_2+G_3+G_4) & -G_3 & -G_4 \\ -G_3 & (G_3+G_5) & -G_5 \\ -G_4 & -G_5 & (G_4+G_5+G_6) \end{bmatrix} \begin{bmatrix} v_1 \\ v_2 \\ v_3 \end{bmatrix} = \begin{bmatrix} i_{S_1} - i_{S_4} \\ i_{S_4} - i_{S_2} - i_{S_5} \\ i_{S_3} + i_{S_5} \end{bmatrix}$$

G $\quad$ V $\quad$ I_S



Em termos das resistências

1:

$$\frac{v_1}{R_1} + \frac{v_1}{R_2} + \frac{v_1 - v_2}{R_3} + \frac{v_1 - v_3}{R_4} = i_{s_1} - i_{s_4} \quad (I)$$

2:

$$\frac{v_2 - v_1}{R_3} + \frac{v_2 - v_3}{R_5} = i_{s_4} - i_{s_2} - i_{s_5} \quad (II)$$

3:

$$\frac{v_3 - v_2}{R_5} + \frac{v_3 - v_1}{R_4} + \frac{v_3}{R_6} = i_{s_3} + i_{s_5} \quad (III)$$

Análise Nodal

Nó K:

$$\sum_{m}' \frac{v_K - v_m}{R_{Km}} = \sum_{\ell}' i_{s\ell}$$

m: nós conectados em K.

ℓ: fontes de corrente conectadas em K

$\begin{cases} i_{s\ell} > 0 \rightarrow \text{Correntes } \underline{\text{entram}} \text{ no nó K} \\ i_{s\ell} < 0 \rightarrow \quad " \quad \underline{\text{saem}} \text{ do } " \end{cases}$