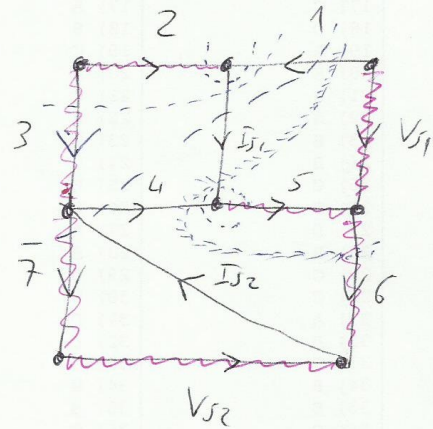
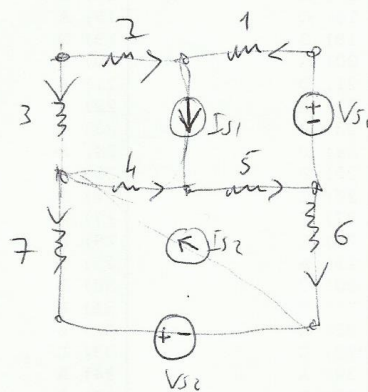


Solutions of HW3



$$2) i_2 - I_{S1} + i_1 = 0 \rightarrow i_2 = -i_1 + I_{S1}$$

$$3) i_3 + I_{S1} - i_1 = 0 \rightarrow i_3 = i_1 - I_{S1}$$

$$5) i_5 - i_4 - I_{S1} = 0 \rightarrow i_5 = i_4 + I_{S1}$$

$$6) i_6 - i_4 - I_{S1} + i_1 = 0 \rightarrow i_6 = -i_1 + i_4 + I_{S1}$$

$$7) i_7 + i_4 + I_{S1} - I_{S2} - i_1 = 0 \rightarrow i_7 = i_1 - i_4 - I_{S1} + I_{S2}$$

$$V_1 - V_2 + V_3 + V_7 + V_{S2} - V_6 - V_{S1} = 0 \rightarrow V_1 = V_2 - V_3 + V_6 - V_7 + V_{S1} - V_{S2}$$

$$V_4 + V_5 + V_6 - V_{S2} - V_7 = 0 \Rightarrow V_4 = -V_5 - V_6 + V_7 + V_{S2}$$

$$2) G_2 V_2 = -G_1 V_1 + I_{S1}$$

$$3) G_3 V_3 = G_1 V_1 - I_{S1}$$

$$5) G_5 V_5 = G_4 V_4 + I_{S1}$$

$$6) G_6 V_6 = -G_1 V_1 + G_4 V_4 + I_{S1}$$

$$7) G_7 V_7 = G_1 V_1 - G_4 V_4 - I_{S1} + I_{S2}$$

$$2) G_2 V_2 = -G_1 (V_2 - V_3 + V_6 - V_7 + V_{S1} - V_{S2}) + I_{S1}$$

$$3) G_3 V_3 = G_1 (V_2 - V_3 + V_6 - V_7 + V_{S1} - V_{S2}) - I_{S1}$$

$$5) G_5 V_5 = G_4 (-V_5 - V_6 + V_7 + V_{S2}) + I_{S1}$$

$$6) G_6 V_6 = -G_1 (V_2 - V_3 + V_6 - V_7 + V_{S1} - V_{S2}) + G_4 (-V_5 - V_6 + V_7 + V_{S2}) + I_{S1}$$

$$7) G_7 V_7 = G_1 (V_2 - V_3 + V_6 - V_7 + V_{S1} - V_{S2}) - G_4 (-V_5 - V_6 + V_7 + V_{S2}) - I_{S1} + I_{S2}$$

$$2) (G_1 + G_2) V_2 - G_1 V_3 + G_1 V_6 + G_1 V_7 = -G_1 V_{S1} + G_1 V_{S2} + I_{S1}$$

$$3) -G_1 V_2 + (G_1 + G_3) V_3 - G_1 V_6 + G_1 V_7 = G_1 V_{S1} - G_1 V_{S2} - I_{S1}$$

$$5) (G_4 + G_5) V_5 + G_4 V_6 - G_4 V_7 = G_4 V_{S2} + I_{S1}$$

$$6) G_1 V_2 - G_1 V_3 + G_4 V_5 + (G_1 + G_4 + G_6) V_6 - (G_1 + G_4) V_7 = -G_1 V_{S1} + (G_1 + G_4) V_{S2} + I_{S1}$$

$$7) -G_1 V_2 + G_1 V_3 - G_4 V_5 - (G_1 + G_4) V_6 + (G_1 + G_4 + G_7) V_7 = G_1 V_{S1} - (G_1 + G_4) V_{S2} - I_{S1} + I_{S2}$$

$$\begin{bmatrix} G_1 + G_2 & -G_1 & 0 & G_1 & G_1 \\ -G_1 & G_1 + G_3 & 0 & -G_1 & G_1 \\ 0 & 0 & G_4 + G_5 & G_4 & -G_4 \\ G_1 & -G_1 & G_4 & G_1 + G_4 + G_6 & -G_1 - G_4 \\ -G_1 & G_1 & -G_4 & -G_1 - G_4 & G_1 + G_4 + G_7 \end{bmatrix} \begin{bmatrix} V_2 \\ V_3 \\ V_5 \\ V_6 \\ V_7 \end{bmatrix} =$$

$$= \begin{bmatrix} -G_1 & G_1 & 1 & 0 \\ G_1 & -G_1 & -1 & 0 \\ 0 & G_4 & 1 & 0 \\ -G_1 & G_1 + G_4 & 1 & 0 \\ G_1 & -(G_1 + G_4) & -1 & 1 \end{bmatrix} \begin{bmatrix} V_{S1} \\ V_{S2} \\ I_{S1} \\ I_{S2} \end{bmatrix}$$