



Направления остальных токов совпадают с направлениями ЭДС

$$\begin{aligned}
 E_1 &:= 100 & E_3 &:= 150 & E_5 &:= -40 & E_7 &:= 90 \\
 R_2 &:= 20 & R_4 &:= 90 & R_5 &:= 20 & R_7 &:= 30 & R_8 &:= 90 \\
 J_6 &:= 1
 \end{aligned}$$

$$I_{11} := 0 \quad I_{22} := 0 \quad I_{33} := 0 \quad I_{44} := 0$$

given

$$I_{22} = J_6$$

$$I_{11} \cdot (R_2 + R_4) + -I_{22} \cdot R_2 + I_{44} \cdot R_4 = E_1 + E_3$$

$$I_{33} \cdot (R_8 + R_7) + I_{22} \cdot R_7 - I_{44} \cdot R_8 = E_3 - E_7$$

$$I_{44} \cdot (R_8 + R_4 + R_5) + I_{11} \cdot R_4 - I_{33} \cdot R_8 = -E_5$$

$$\begin{pmatrix} I_{11} \\ I_{22} \\ I_{33} \\ I_{44} \end{pmatrix} := \text{find}(I_{11}, I_{22}, I_{33}, I_{44}) = \begin{pmatrix} 4.656 \\ 1 \\ -1.768 \\ -2.691 \end{pmatrix}$$

$$I_1 := I_{11} = 4.656$$

$$I_2 := I_{11} - I_{22} = 3.656$$

$$I_3 := I_{11} + I_{33} = 2.888$$

$$I_4 := I_{11} + I_{44} = 1.965$$

$$I_5 := -I_{44} = 2.691$$

$$I_6 := I_{22} = 1$$

$$I_7 := -I_{33} - I_{22} = 0.768$$

$$I_8 := I_{44} - I_{33} = -0.923$$

$$P_1 := E_1 \cdot I_1 + E_3 \cdot I_3 + E_5 \cdot I_5 + E_7 \cdot I_7 + J_6 \cdot (E_7 - I_2 \cdot R_2 - I_7 \cdot R_7) = 854.17$$

$$P_2 := I_2^2 \cdot R_2 + I_4^2 \cdot R_4 + I_5^2 \cdot R_5 + I_7^2 \cdot R_7 + I_8^2 \cdot R_8 = 854.17$$