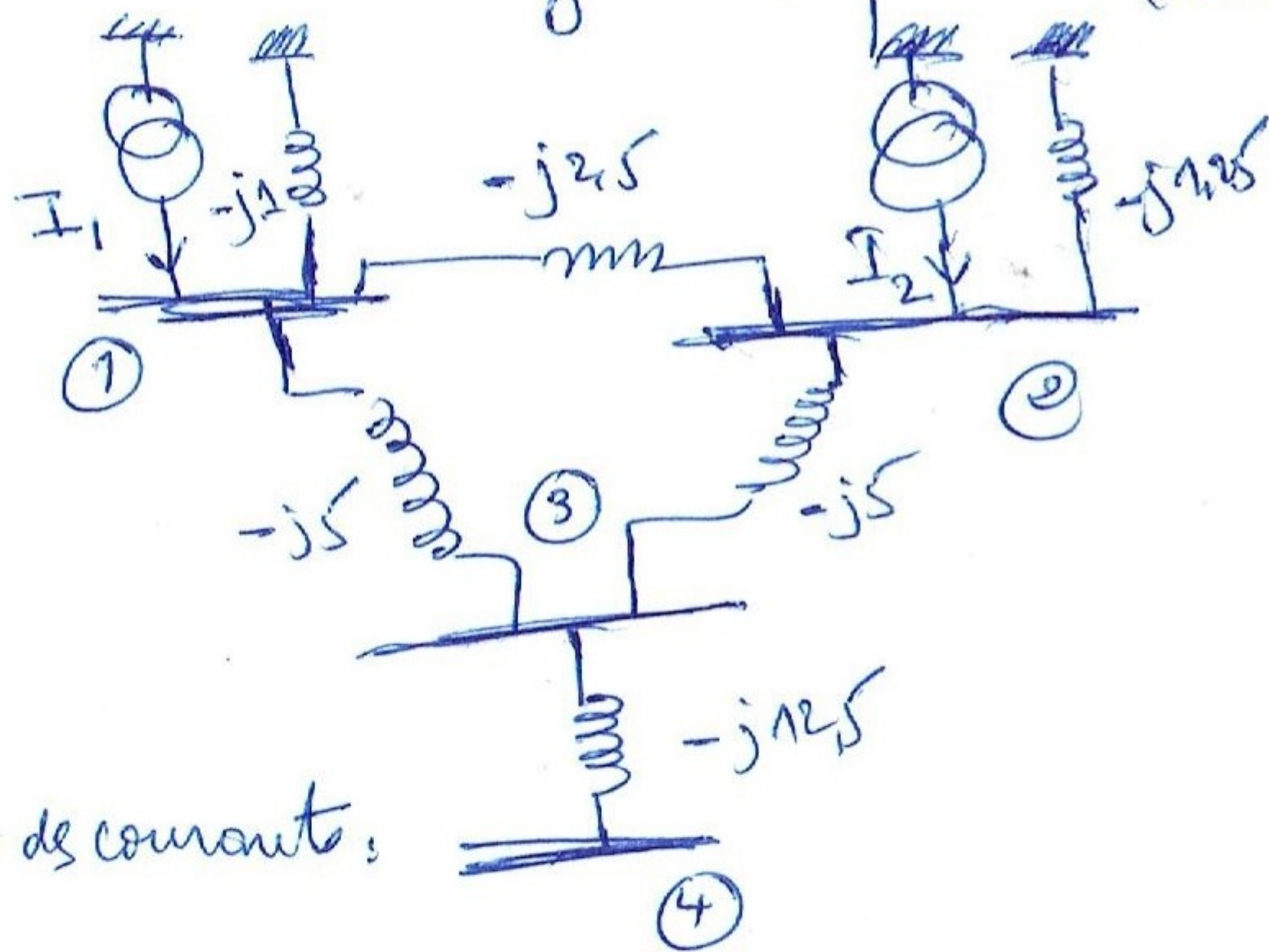


Solution TD n° 3

exo 1

① transformer tous les lignes en admittance (admittance)



② les équations de courants:

$$\begin{cases} I_1 = (-j1 - j2.5 - j5) V_1 + j2.5 V_2 + j5 V_3 \\ I_2 = (V_2 - 0)(-j1.25) + (V_2 - V_1)(-j2.5) + (V_2 - V_3)(-j5) \\ I_3 = (V_3 - V_1)(-j5) + (V_3 - V_2)(-j5) + (V_3 - V_4)(-j12.5) \\ I_4 = (V_4 - V_3)(-j12.5) \end{cases}$$

$$\begin{cases} I_1 = -j8.5 V_1 + j2.5 V_2 + j5 V_3 \\ I_2 = +j2.5 V_1 - j8.75 V_2 + j5 V_3 \\ I_3 = j5 V_1 + j5 V_2 - j29.5 V_3 + j12.5 V_4 \\ I_4 = +j12.5 V_3 - j12.5 V_4 \end{cases}$$

③ la matrice admittance:

$$Y_{11} = -j8.5 \quad | \quad Y_{22} = -j8.75 \quad | \quad Y_{33} = -j29.5 \quad | \quad Y_{44} = -j12.5$$

$$Y_{12} = Y_{21} = j2.5 \quad | \quad Y_{13} = j5 \quad | \quad Y_{14} = 0 = Y_{41}$$

$$Y_{32} = Y_{23} = j5 \quad | \quad Y_{24} = Y_{42} = 0 \quad | \quad Y_{34} = Y_{43} = j12.5$$

$$Y_{Bus} = \begin{bmatrix} j8.5 & j2.5 & j5 & 0 \\ j2.5 & -j8.75 & j5 & j12.5 \\ j5 & j5 & -j29.5 & j12.5 \\ 0 & j12.5 & j12.5 & -j12.5 \end{bmatrix}$$

exo 2 les mêmes étapes avec l'admittance de

capacité c (admittance de capacité) $y_c = \frac{1}{Z_c} = \frac{1}{-j4} = j0.25$

par exemple $Y_{11} = \left(\frac{1}{Z_c} + \frac{1}{Z_{10}} + \frac{1}{Z_{12}} + \frac{1}{Z_{14}} + \frac{1}{Z_B} \right)$

$$Y_{11} = (j0.25) + \frac{1}{j0.25} + \frac{1}{j0.25} + \frac{1}{j0.1} + \frac{1}{j0.4}$$

$$= (j0.25 - j4 - j4 - j10 - j25) = -j42.75$$