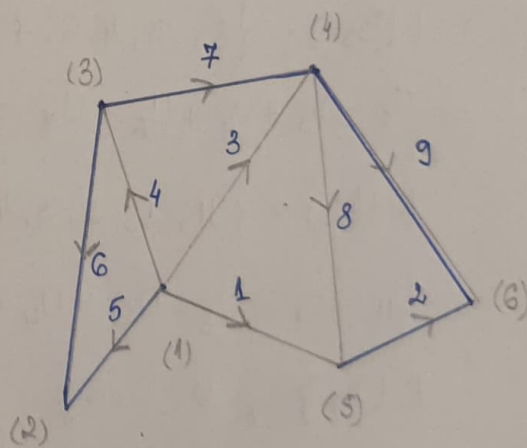
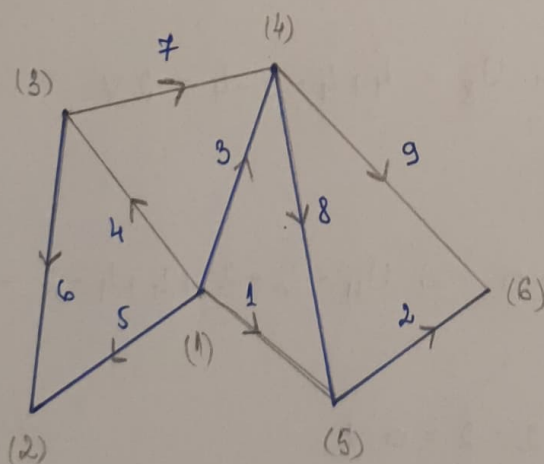


TEMĂ CURS 3

① Graf. conex $G(N, L)$: n -noduri , l -laturi

- a) $n-1$ laturi arbore (ramuri) ; $l-n+1$ laturi coarbori (coarde).
- b) nr. bucle = nr. coarde $\Rightarrow l-n+1$ bucle
- c) Deoarece trece prin toate nodurile, arborele este un subgraf conex. Coarborile poate fi subgraf neconex deoarece trece prin toate laturile care nu fac parte din arbore, se pot exclude noduri.
- d) Buclele se stabilesc în funcție de coarde. Coarborile prezintă bucle, arborele poate conține.

②



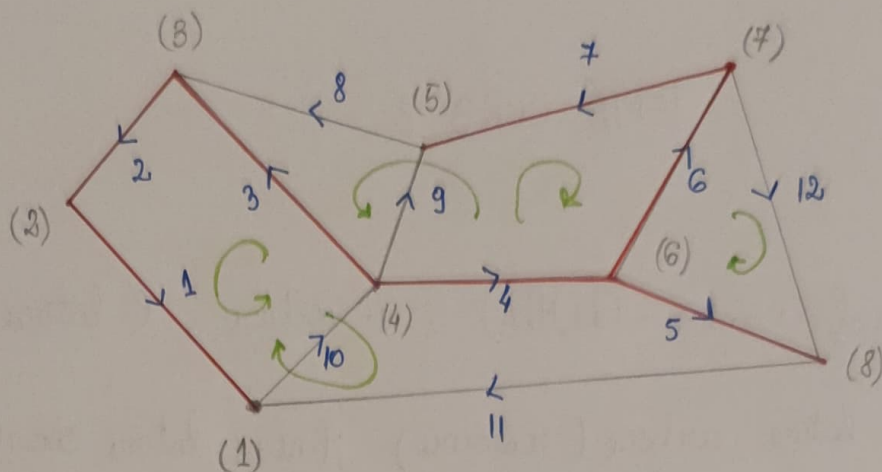
$$C = \{1, 4, 7, 9\}$$

$$L(B_1) = \{4, 5, 6\}, \quad L(B_2) = \{7, 6, 5, 3\}, \quad L(B_3) = \{1, 3, 8\},$$

$$L(B_4) = \{9, 8, 2\}.$$

* Se pot alege mai mulți arbori în afară de cei doi.

3.



$$U_1 = 6V, U_2 = -2V, U_3 = 4V, U_4 = -4V, U_5 = 2V, U_6 = 2V, U_7 = 4V.$$

Aplicăm pasul 4 din algoritmul (TK.2):

$$L(B_1) = \{10, 1, 2, 3\}$$

$$U_{10} + U_3 + U_2 + U_1 = 0 \Rightarrow U_{10} = -4 + 2 - 6 = -8V$$

$$L(B_2) = \{9, 4, 6, 7\}$$

$$U_9 - U_7 - U_6 - U_4 = 0 \Rightarrow U_9 = 4 + 2 + 4 = 10V$$

$$L(B_3) = \{8, 3, 4, 6, 7\}$$

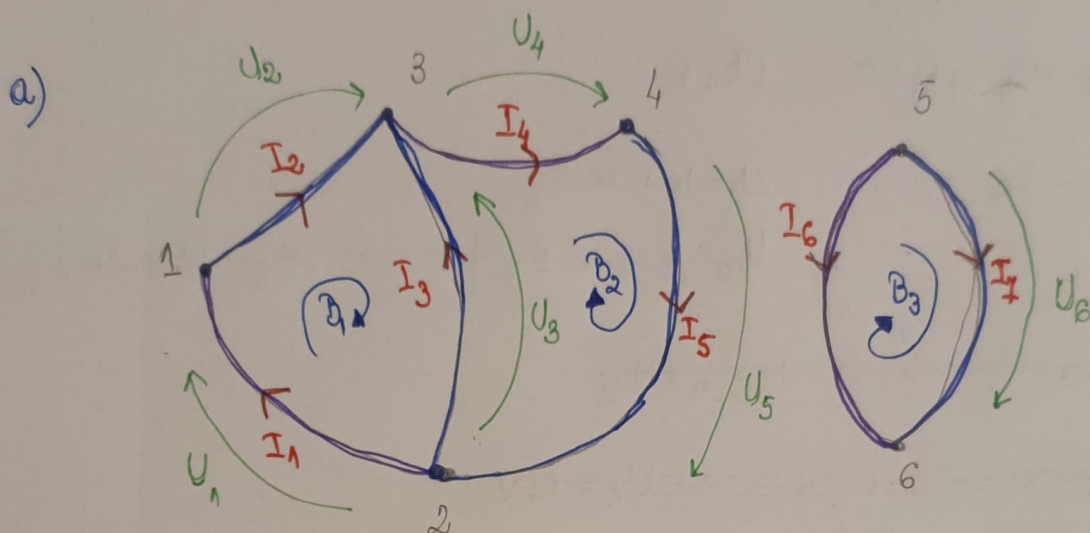
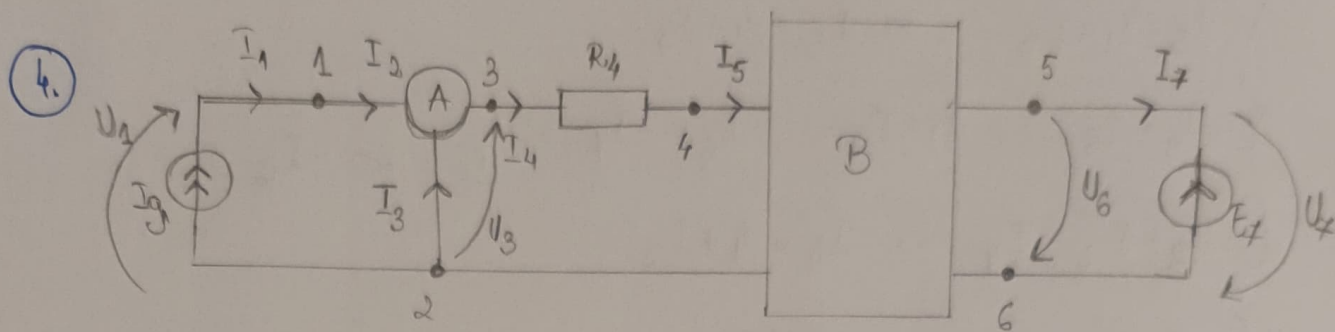
$$U_8 - U_3 + U_4 + U_6 + U_7 = 0 \Rightarrow U_8 = 4 + 4 - 2 - 4 = 2V.$$

$$L(B_4) = \{11, 1, 2, 3, 4, 5\}$$

$$U_{11} - U_1 - U_2 - U_3 + U_4 + U_5 = 0 \Rightarrow U_{11} = 6 - 2 + 4 + 4 - 2 = 10V$$

$$L(B_5) = \{12, 6, 5\}$$

$$U_{12} - U_5 + U_6 = 0 \Rightarrow U_{12} = 2 - 2 = 0V$$



b) $N = 6, L = 7$

c) $I_{g1} = 4A, R_4 = 4\Omega, E_7 = 12V, \begin{bmatrix} U_2 \\ U_3 \end{bmatrix} = R_A \begin{bmatrix} I_2 \\ I_3 \end{bmatrix},$

$$\begin{bmatrix} I_5 \\ U_6 \end{bmatrix} = H_B \begin{bmatrix} U_5 \\ I_6 \end{bmatrix}; \quad H_B = \begin{bmatrix} 2 & -1 \\ 3 & 0 \end{bmatrix}; \quad R_A = \begin{bmatrix} 5 & 20 \\ 2 & 10 \end{bmatrix}$$

$$\begin{bmatrix} I_5 \\ U_6 \end{bmatrix} = \begin{bmatrix} 2 & -1 \\ 3 & 0 \end{bmatrix} \begin{bmatrix} U_5 \\ I_6 \end{bmatrix} \Rightarrow \begin{cases} I_5 = 2U_5 - I_6 \\ U_6 = 3U_5 \end{cases} \Rightarrow U_5 = \frac{U_6}{3}$$

$$\begin{bmatrix} U_2 \\ U_3 \end{bmatrix} = \begin{bmatrix} 5 & 20 \\ 2 & 10 \end{bmatrix} \begin{bmatrix} I_2 \\ I_3 \end{bmatrix} \Rightarrow \begin{cases} U_2 = 5I_2 + 20I_3 \\ U_3 = 2I_2 + 10I_3 \end{cases}$$

(B3): $U_6 = E_7 = 12V \Rightarrow U_5 = \frac{12}{3} = 4V$

$$\begin{cases} I_5 = I_1 + I_3 \Rightarrow I_5 = 4 + I_3 \\ I_4 = I_5, \quad I_1 = I_2, \quad I_6 = -I_7 & I_5 = 20 - I_6 \\ I_2 + I_3 = I_4 \Rightarrow I_4 = 4 + I_3 \end{cases}$$

$$\begin{cases} U_1 + U_2 - U_3 = 0 & (B_1) \\ U_3 + U_4 + U_5 = 0 & (B_2) \end{cases}$$

$$I_2 = I_1 = 4A$$

$$: \quad U_2 = 10 + 20I_3$$

$$U_3 = 8 + 10I_3 \quad | \cdot 2 \Rightarrow 2U_3 = 16 + 20I_3 \Rightarrow$$

$$\Rightarrow U_3 - U_2 = 6 \Rightarrow U_3 = 6 + U_2$$

$$\Rightarrow U_1 + U_2 - 6 - U_2 = 0 \Rightarrow U_1 = 6V$$

$$U_4 = I_4 R_4 = 4I_4 = 4(4 + I_3) = 16 + 4I_3$$

$$U_3 = 8 + 10I_3$$

$$8 + 10I_3 + 16 + 4I_3 + 4 = 0 \Rightarrow 14I_3 = -28 \Rightarrow \boxed{I_3 = -2A}$$

$$U_2 = 10 + 20I_3 = 10 - 40 = -20V \Rightarrow \boxed{U_2 = -20V}$$

$$U_3 = 8 + 10I_3 \Rightarrow \boxed{U_3 = -12V}$$

$$U_1 = U_3 - U_2 = 8V \Rightarrow \boxed{U_1 = 8V}$$

$$U_4 = 16 + 4I_3 \Rightarrow \boxed{U_4 = 8V}$$

$$\boxed{U_5 = 4V}, \boxed{U_6 = 12V}$$

$$I_5 = 4 + I_3 \Rightarrow \boxed{I_5 = 2A}, \quad I_6 = 20 - I_5 \Rightarrow \boxed{I_6 = 18A}$$

$$I_4 = 4 + I_3 \Rightarrow \boxed{I_4 = 2A}, \quad \boxed{I_2 = I_1 = 4A}$$