

a- $x_1 + 100 = x_2 + 400$

$$x_1 - x_2 = 300$$

b- $x_2 + 300 = x_3 + 400$

$$x_2 - x_3 = 100$$

$$x_3 + 750 = x_4 + 250$$

$$x_3 - x_4 = -500$$

$$x_4 + 200 = x_1 + 300$$

$$x_4 - x_1 = 100$$

$$\begin{bmatrix} 1 & -1 & 0 & 0 & 300 \\ 0 & 1 & -1 & 0 & 100 \\ 0 & 0 & 1 & -1 & -500 \\ -1 & 0 & 0 & 1 & 100 \end{bmatrix}$$

$$x_4 = t$$

$$x_1 = t - 100$$

$$x_2 = t - 400$$

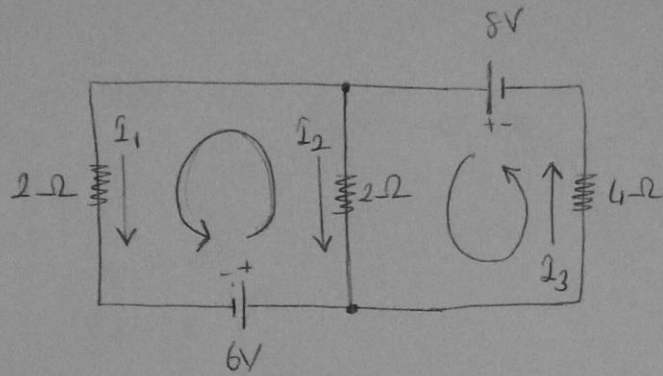
$$x_3 = t - 500$$

c- The flow along the road from A to B is reduced.

$$x_3 = t - 500$$

$t = 500$ It is the minimum flow

2.



$$I_3 = I_1 + I_2$$

$$6V = 2 \cdot I_1 - 2 I_2$$

$$8V = 2 I_2 + 4 I_3$$

$$(6+8)V = 2 I_1 + 4 I_3$$

$$I_1 + I_2 - I_3 = 0$$

$$2 I_1 - 2 I_2 = 6$$

$$2 I_2 + 4 I_3 = 8$$

$$2 I_1 + 4 I_3 = 14$$

$$\begin{bmatrix} 1 & 1 & -1 & 0 \\ 2 & -2 & 0 & 6 \\ 0 & 2 & +4 & 8 \\ 2 & 0 & 4 & 14 \end{bmatrix}$$

$$\left. \begin{array}{l} R_2 \rightarrow R_2/2 \\ R_3 \rightarrow R_3/2 \\ R_4 \rightarrow R_4/2 \end{array} \right\}$$

$$\begin{bmatrix} 1 & 1 & -1 & 0 \\ 1 & -1 & 0 & 3 \\ 0 & 1 & 2 & 4 \\ 1 & 0 & 2 & 7 \end{bmatrix}$$

$$R_4 \rightarrow R_4 + 2R_1$$

$$\begin{bmatrix} 1 & 1 & -1 & 0 \\ 1 & -1 & 0 & 3 \\ 0 & 1 & 2 & 4 \\ 3 & 2 & 0 & 7 \end{bmatrix} \rightarrow \begin{array}{l} 2(I_1 - I_2 = 3) \\ + 3I_1 + 2I_2 = 7 \end{array}$$

$$I_1 = \frac{13}{5} \quad I_2 = -\frac{2}{5}$$

$$I_3 = \frac{11}{5}$$

$$3. \quad \int_0^1 e^{x^2} dx \quad \frac{1-0}{4} = 0,25$$

$$\begin{array}{ll} x_0 = 0 & y_0 = 1 \\ x_1 = 0,25 & y_1 = e^{1/16} \\ x_2 = 0,50 & y_2 = e^{1/4} \\ x_3 = 0,75 & y_3 = e^{9/16} \\ x_4 = 1 & y_4 = e \end{array}$$

$$\underline{p(x)} = a_0 + a_1 \cdot x + a_2 \cdot x^2 + a_3 \cdot x^3 + a_4 \cdot x^4$$

$$y = a_0 + a_1 x + a_2 x^2 + a_3 x^3 + a_4 x^4$$

$$a_0 + a_1 \cdot 0 + a_2 \cdot 0 + a_3 \cdot 0 + a_4 \cdot 0 = 1$$

$$a_0 + a_1 \cdot \frac{1}{4} + a_2 \cdot \frac{1}{16} + a_3 \cdot \frac{1}{64} + a_4 \cdot \frac{1}{256} = e^{1/16}$$

$$a_0 + a_1 \cdot \frac{1}{2} + a_2 \cdot \frac{1}{4} + a_3 \cdot \frac{1}{8} + a_4 \cdot \frac{1}{16} = e^{1/4}$$

$$a_0 + a_1 \cdot \frac{3}{4} + a_2 \cdot \frac{9}{16} + a_3 \cdot \frac{27}{64} + a_4 \cdot \frac{81}{256} = e^{9/16}$$

$$a_0 + a_1 \cdot 1 + a_2 \cdot 1^2 + a_3 \cdot 1^3 + a_4 \cdot 1^4 = e$$