

$$\begin{aligned} E_1 &= 2.00\text{V} \\ E_2 &= 3.80\text{V} \\ E_3 &= 5.00\text{V} \end{aligned}$$

$$\begin{aligned} R_1 &= 1.20\Omega \\ R_2 &= 2.30\Omega \end{aligned}$$

①  $i_3 = i_1 + i_2$

M1 (b, horario)

$$\begin{aligned} -i_1 R_1 + E_1 - i_1 R_1 - i_3 R_2 - E_2 &= 0 \\ E_1 - E_2 &= 2i_1 R_1 + (i_1 + i_2) R_2 \end{aligned}$$

M2 (b, anti-horario)

$$\begin{aligned} -i_2 R_1 + E_3 - i_2 R_1 - i_3 R_2 - E_2 &= 0 \\ E_3 - E_2 &= 2i_2 R_1 + (i_1 + i_2) R_2 \end{aligned}$$

①  $E_1 - E_2 = i_1(2R_1 + R_2) + i_2 R_2$

②  $E_3 - E_2 = i_2(2R_1 + R_2) + i_1 R_2$

① - ②

$$\begin{aligned} E_1 - E_3 &= i_1(2R_1 + R_2 - R_2) + i_2(R_2 - 2R_1 - R_2) \\ E_1 - E_3 &= 2(i_1 R_1 - i_2 R_1) = 2R_1(i_1 - i_2) \end{aligned}$$

$$\begin{aligned} i_1 - i_2 &= a \\ a &= \frac{E_1 - E_3}{2R_1} \Rightarrow \textcircled{3} \quad i_1 = a + i_2 \end{aligned}$$

$$a = \frac{E_1 - E_3}{2R_1}$$

$$a = -5 \frac{\text{V}}{\Omega}$$

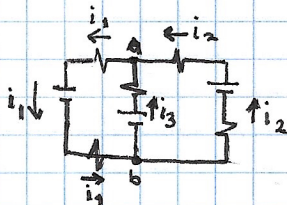
$$a = -50 \text{ mA}$$

③ → ①

$$\begin{aligned} E_1 - E_2 &= (a + i_2)(2R_1 + R_2) + i_2 R_2 \\ E_1 - E_2 &= a(2R_1 + R_2) + i_2(2R_1 + R_2 + R_2) \\ i_2 &= \frac{E_1 - E_2 - a(2R_1 + R_2)}{2(R_1 + R_2)} \end{aligned}$$

$$i_2 = 0.5821 \text{ A}$$

④  $i_2 = 582 \text{ mA}$  hacia arriba



$$V_a - V_b = E_2 - i_3 R_2$$

$$V_{ab} = 3.60 \text{ V}$$

④ → ③

$$i_1 = -1250 \text{ mA} + 582 \text{ mA}$$

$$i_1 = -668 \rightarrow (-) \rightarrow \text{va en direcc. contr.}$$

⑤  $\therefore i_1 = 668 \text{ mA}$  hacia abajo

⑤ + ④ → ⑥

$$i_3 = -668 \text{ mA} + 582 \text{ mA}$$

$$i_3 = -86 \rightarrow (-) \rightarrow \text{va hacia arriba}$$

$$i_3 = 86 \text{ mA}$$
 hacia arriba.

$\therefore$  a)  $i_1 = 668 \text{ mA}$  hacia abajo,  $i_2 = 582 \text{ mA}$  hacia arriba,  $i_3 = 86 \text{ mA}$  hacia arriba.

b)  $V_{ab} = 3.60 \text{ V}$