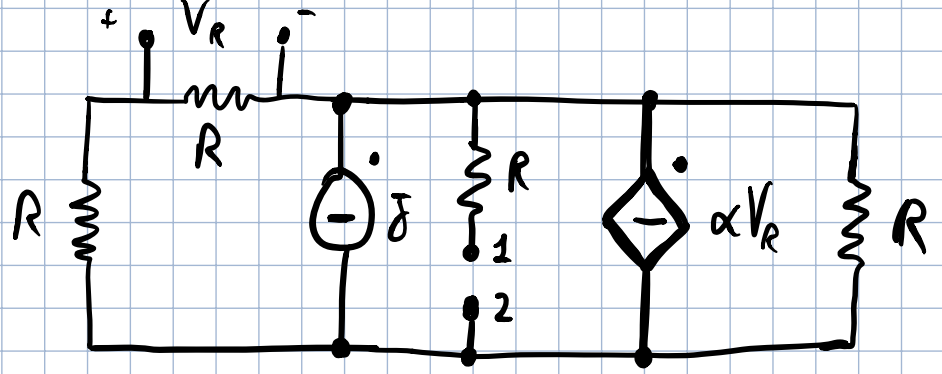
31/01/2018

1)

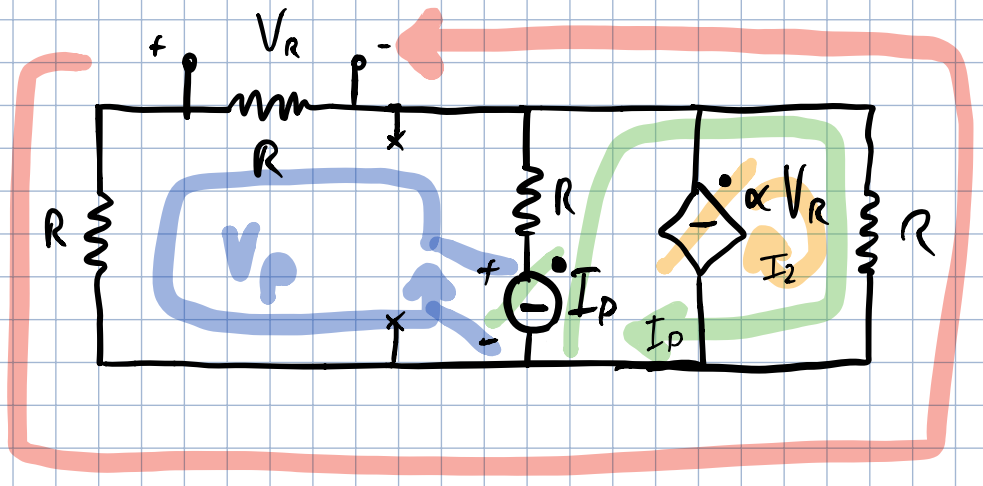


$R = 10\ \Omega$

$J = 2\ A$

$\alpha = 0.2\ A/V$

$I_P = 1\ A$



$$\begin{cases} I_2 = \alpha V_R \\ 3R I_1 - R(I_P + I_2) = 0 \end{cases}$$

$$V_R = I_1(2R) - R(I_2 + I_P)$$

(αV_R)

$$V_R + R\alpha V_R = I_1 \cdot 2R - R I_P \qquad V_R = \frac{2R I_1 - R I_P}{(1 + R\alpha)}$$

$$\begin{cases} I_2 = \alpha \dfrac{2R I_1 - R I_P}{1 + R\alpha} \\ I_1 = \dfrac{R(I_P + I_2)}{3R} \end{cases}$$

$$\begin{cases} I_2 = \dfrac{\alpha\left(2R\left(\dfrac{R(I_p+I_2)}{3R}\right)-RI_p\right)}{1+R\alpha} \\ I_1 = \dfrac{R(I_p+I_2)}{3R} \end{cases}$$

$$\begin{cases} I_2 = \dfrac{2R\alpha\frac{I_p}{3}-\frac{2}{3}R\alpha I_2-\alpha R I_p}{1+R\alpha} \\ I_1 = \dfrac{I_p+I_2}{3} \end{cases}$$

$$\begin{cases} I_2 + \overbrace{R\alpha I_2}^{\frac{1}{3}R\alpha I_2} + \frac{2}{3}R\alpha I_2 = 2R\alpha\frac{I_p}{3}-\alpha R I_p \\ I_1 = \dfrac{I_p+I_2}{3} \end{cases}$$

$$\begin{cases} I_2 = \dfrac{\frac{2}{3}R\alpha I_p-\alpha R I_p}{1+\frac{1}{3}R\alpha} = -\frac{2}{5}A \\ I_1 = \ldots = \frac{1}{5}A \end{cases}$$

$$V_p = RI_p + 2RI_1 = 10 + 4 = 14\ V \rightarrow \boxed{R_{TH} = 14\,\Omega}$$

OK

$V_{TH} = ?$