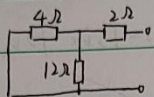


第八章作业

8-2

$$u_c(0^-) = u_c(0^+) = 12V \quad u_c(\infty) = 0V$$

端口等效电路



$$\text{等效电阻 } R_{eq} = 4\Omega // 12\Omega + 2\Omega = 5\Omega$$

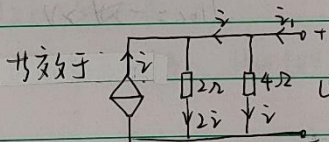
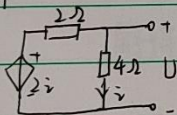
$$\tau = R_{eq} \cdot C = 1s$$

$$u_c(t) = 12 \cdot e^{-t} V$$

$$i_R(t) = \frac{u_c(t)}{R_{eq}} \cdot \frac{4}{16} = 0.6e^{-t} A$$

$$i = \frac{24V}{8\Omega} + \frac{u_c(t)}{R_{eq}} \cdot \frac{12}{16} = 3 + 1.8e^{-t} A$$

8-4

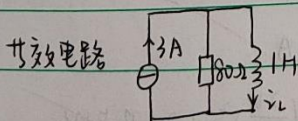


$$\text{易知 } i_1 = 2i_1 \quad U = 2i_1 \quad \therefore R_{eq} = 2\Omega \quad \tau = R_{eq} \cdot C = 1s$$

$$u_c(t) = 10 \cdot e^{-t} V$$

$$i_1(t) = \frac{u_c(t)}{4\Omega} = 2.5 \cdot e^{-t} A$$

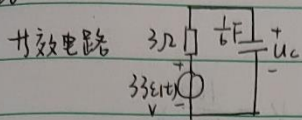
8-13



$$i_L(\infty) = 3A \quad \tau = \frac{1}{80} s$$

$$i_L(t) = 3(1 - e^{-80t}) A$$

8-20



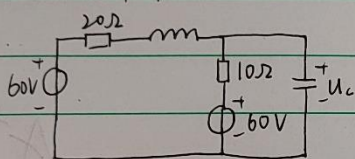
$$u_c(0_+) = u_c(0_-) = 0V$$

$$u_c(\infty) = 33V \quad T = 0.5s$$

$$u_c(t) = 33(1 - e^{-2t}) \varepsilon(t) V$$

8-30

开关打开前等效



$$i_L(0_-) = i_L(0_+) = 0A$$

$$u_c(0_-) = u_c(0_+) = 60V$$

打开后对电感:

$$R_1 = 40\Omega \quad T = \frac{L}{R_1} = \frac{1}{40}s \quad i_L(\infty) = 1.5A$$

$$i_L = 1.5(1 - e^{-40t}) A$$

对电容:

$$R_2 = 20\Omega \quad T = R_2 C = 20s \quad u_c(\infty) = 120V$$

$$u_c(t) = 60e^{-\frac{t}{20}} + 120(1 - e^{-\frac{t}{20}}) = 120 - 60e^{-\frac{t}{20}} V$$

$$u = i_L \cdot 20\Omega - u_c = 30 + 30e^{-40t} - 120 + 60e^{-\frac{t}{20}} = 30e^{-40t} + 60e^{-\frac{t}{20}} - 90 V$$

8-32

$$\tau = R \cdot C = 1s$$

$$(1) \text{ 达到稳态时 } U_{Cmax} = \frac{U_s}{1+e^{-\frac{\tau}{T}}} = \frac{10}{1+e^{-1}} V = \frac{10e}{1+e} V$$

$$U_{Cmin} = \frac{U_s \cdot e^{-\frac{\tau}{T}}}{1+e^{-\frac{\tau}{T}}} = \frac{10e^{-1}}{1+e^{-1}} = \frac{10}{1+e} V$$

