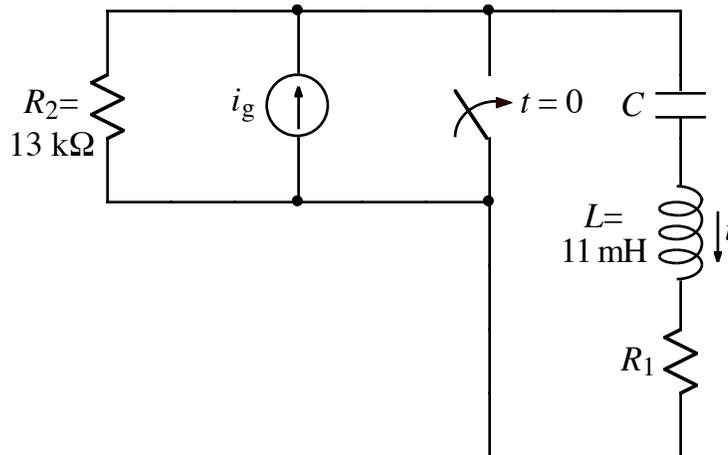


Ex:



After being open for a long time, the switch closes at $t = 0$.

Find the numerical values of R_1 and C to yield the following values of characteristic roots for the above circuit:

$$s_1 = s_2 = -1.5 \text{ Mr/s}$$

SOL'N:

$$s_{1,2} = -\alpha \pm \sqrt{\alpha^2 - \omega_0^2}$$

$$\alpha = \frac{R}{2L} \quad \omega_0^2 = \frac{1}{LC}$$

If $s_1 = s_2$, it must be the case that $\sqrt{\alpha^2 - \omega_0^2} = 0$, or $\alpha^2 = \omega_0^2$ and $s_{1,2} = -\alpha$.

$$s = -1.5 \text{ Mr/s} = -\frac{R}{2(11\text{mH})} \Rightarrow R = +1.5\text{M}(2)11\text{m}\Omega$$

$$R = 33\text{k}\Omega$$

$$\alpha^2 = \omega_0^2 \Rightarrow C = \frac{(2L)^2}{R^2} \cdot \frac{1}{L} = \frac{4(11\text{m})}{(33\text{k})^2} = 40.4 \text{ pF}$$