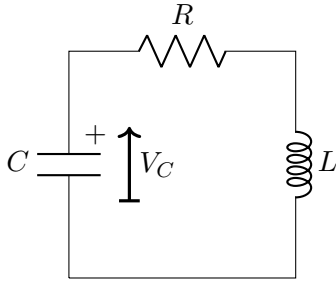
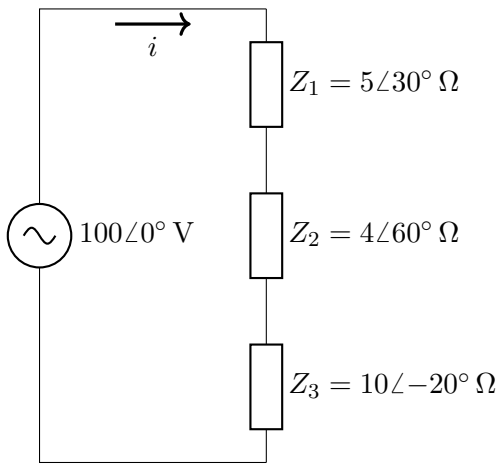


(3) 1. At time $t = 0$ capacitor C is charged up to voltage of $V_C = 100\text{ V}$.



- (a) If $C = 1\ \mu\text{F}$, $R = 10\ \Omega$, $L = 0.1\ \text{H}$, show that the current after $t = 0$ is oscillatory. What is the frequency of oscillation? How long does it take for the voltage amplitude to drop to $10\ \text{V}$?
- (b) Calculate and plot the energies stored in C , L , and the energy dissipated in R as functions of time. Verify (graphically) that the total energy is conserved.



- (4) 2.
- (a) Find the current i .
 - (b) Find the voltage across each impedance.
 - (c) Construct the voltage phasor diagram which verifies (graphically) that $V_1 + V_2 + V_3 = 100\angle 0^\circ\ \text{V}$.

(7) 3. (a) Calculate the peak value of the voltage across the inductor. Here

$$\begin{aligned}
 V_0 &= 10\ \text{V} \\
 \omega &= 2\pi \times 10^3\ \text{s}^{-1} \\
 R &= 1\ \Omega \\
 L &= 25\ \text{mH} \\
 C &= 1\ \mu\text{F}
 \end{aligned}$$

(b) Calculate the Q of the circuit. What is the peak voltage across the inductor on-resonance?

