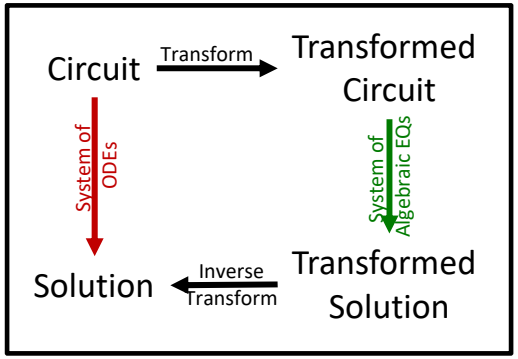
Impedance

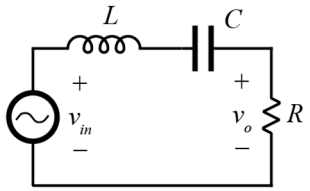
Phasor Circuit Analysis



Goal: Analyze a LTI circuit to find steady-state solution with only single-frequency sinusoidal source(s)

1. Transform all sources & signals into their phasor equivalents
2. Transform all passives into impedances
3. Solve the circuit
   - Use 201 techniques for DC resistor-only circuits
4. Transform solution back into the time domain

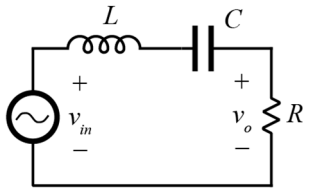
Resonance Example



Find $v_o(t)$ for $v_{in}(t) = 10\sin(\omega t)$ and $\omega = 2\pi 100$ kHz, $R = 10\ \Omega$, $L = 10\ \mu$H, and $C = 253$ nF

Reactance and Resonance

Phasor Superposition



Find $v_o(t)$ for $v_{in}(t) = 10\cos(\omega t) + 10\cos(2\omega t) + 10\cos(0.5\omega t)$
and $\omega = 2\pi 100$ kHz, $R = 10\ \Omega$, $L = 10\ \mu$H, and $C = 253$ nF