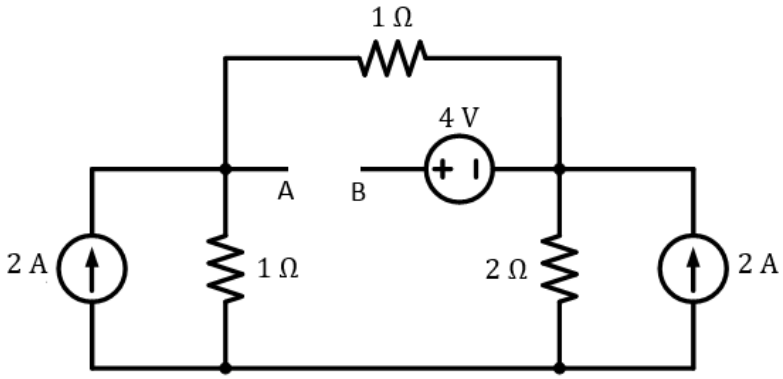
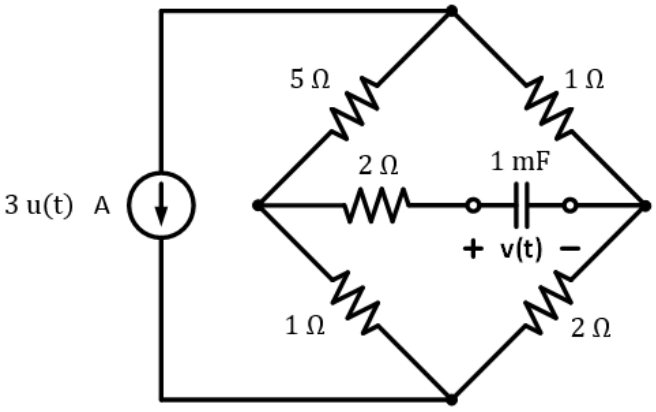
Practice Final

Problem 1



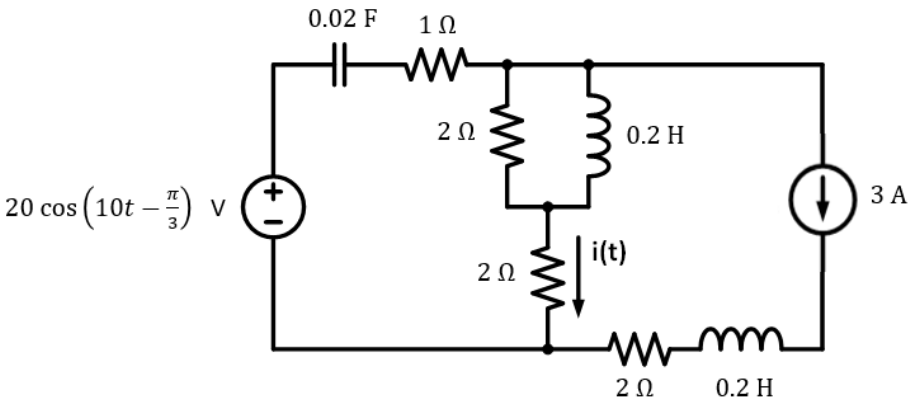
(a) Find the Thevenin equivalent model between A and B.
(b) If we were to place a 1.5 Ω resistor between A and B in the circuit above, what is the current through that resistor (measured from A to B)?

Problem 2



(a) Find v(t) for t ≥ 0.
(b) Sketch the waveform of v(t) for t ≥ 0.

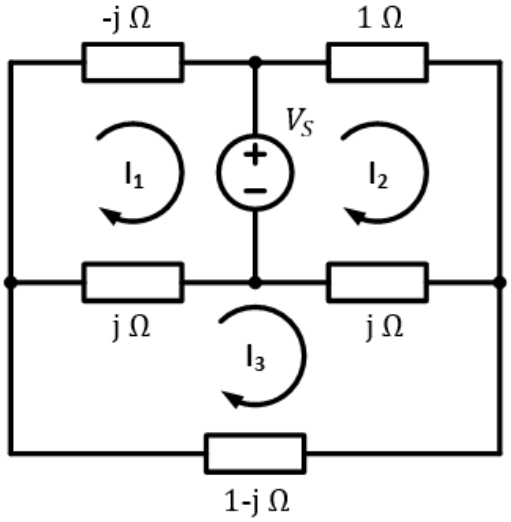
Problem 3



Find the steady-state response of i(t).

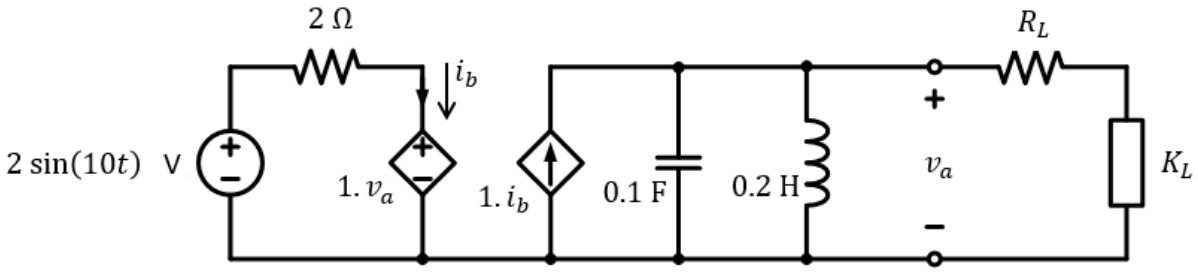
Problem 4

$V_S = \sqrt{2}e^{j\frac{\pi}{5}}$ V



(a) Find the values of the mesh current phasors, I_1, I_2, and I_3 (in polar form).
(b) Find the complex power <u>supplied</u> by V_S.

Problem 5



A load (R_L + K_L) is connected to a power distribution network consisting of a resistor, inductor, capacitor and AC voltage source. The load itself includes a resistor R_L in series with a mystery element K_L, where K_L is either a capacitor or an inductor. The goal is to maximize the average power delivered to the load.

(a) Determine the values of R_L and K_L for the circuit that cause maximum power transfer to the load.
(b) Determine the mystery element (a capacitor or an inductor; and its value).
(c) Calculate the maximum power transferred to the load.