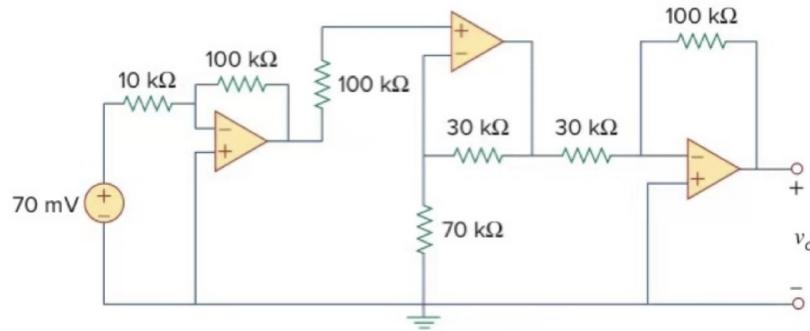


Due Date: 23:59, June 12th, 2025

In order to get full marks, you shall write all the intermediate steps of calculation or proof, unless otherwise indicated.

Exercise 3.1 (20%) Find v_o in the following op amp circuit.



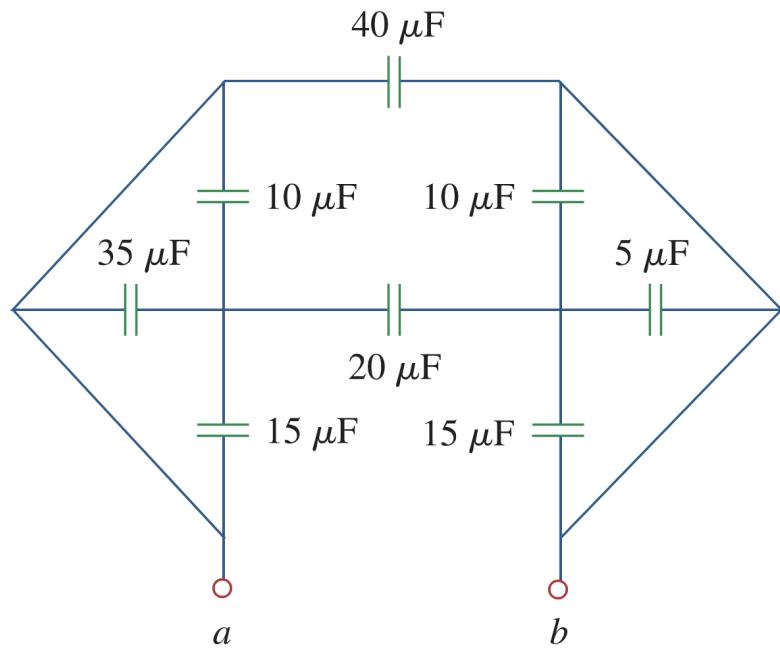
Exercise 3.2 (30%) A 4-mF capacitor has the terminal voltage

$$v(t) = \begin{cases} 50 \text{ V}, & t \leq 0 \\ Ae^{-100t} + Be^{-600t} \text{ V}, & t > 0 \end{cases}$$

If the capacitor has an initial current of 2A, find:

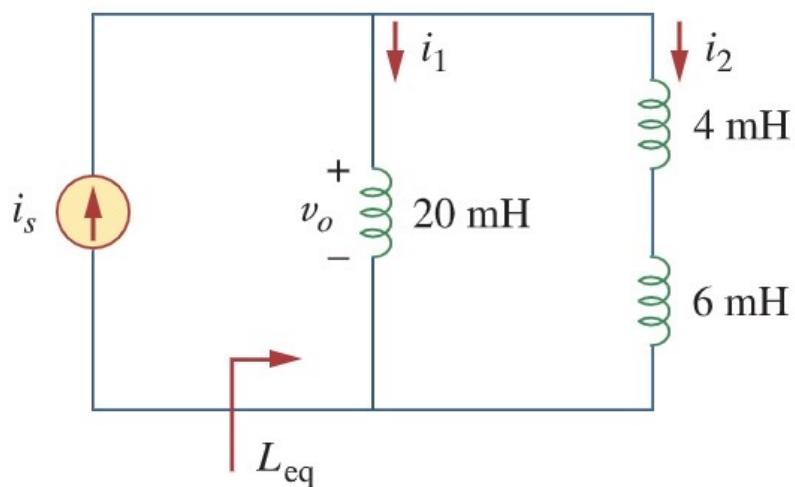
- (a) (10%) the constants A and B ,
- (b) (10%) the energy stored in the capacitor at $t = 0$,
- (c) (10%) the capacitor current for $t > 0$.

Exercise 3.3(10%) Determine C_{eg} for the circuit.



Exercise 3.4 (20%) Find:

- (a) (10%) L_{eq} , $i_1(t)$, and $i_2(t)$ if $i_s = 3e^{-t}$ mA,
- (b) (5%) $v_o(t)$,
- (c) (5%) energy stored in the 20-mH inductor at $t = 1$ s.



Exercise 3.5 (20%) At $t = 1.5ms$, calculate v_o , due to the cascaded integrators, Assume that the integrators are reset to $0V$ at $t = 0$.

