

EE1101: Circuits and Network Analysis

Assignment - 07

Handed out: 20 - Sep - 2024

Due : 30 - Sep - 2024 (before 5 PM)

Instructions :

1. Please upload your assignment solutions to the course page on the Canvas platform. Only solutions submitted through canvas will be reviewed. For specific guidelines, refer to the instructions provided on the course page.
2. It is suggested that you attempt all the problems. However, it is sufficient to submit solutions for problems that total 10 points.
3. Submissions received after the deadline will attract negative marking. Ensure that your submissions are named in the following format: RollNo-Assignment-07.pdf.

1. (16 points) Consider the first-order circuits shown in Fig. 1.

- (a) (4 points) Compute the source current and inductor current for the circuit shown in Fig. 1(a).
- (b) (4 points) Compute the voltage across the resistor and the inductor current for the circuit shown in Fig. 1(b).
- (c) (4 points) Compute the source current and capacitor current for the circuit shown in Fig. 1(c).
- (d) (4 points) Compute the voltage across the resistor and the capacitor current for the circuit shown in Fig. 1(d).

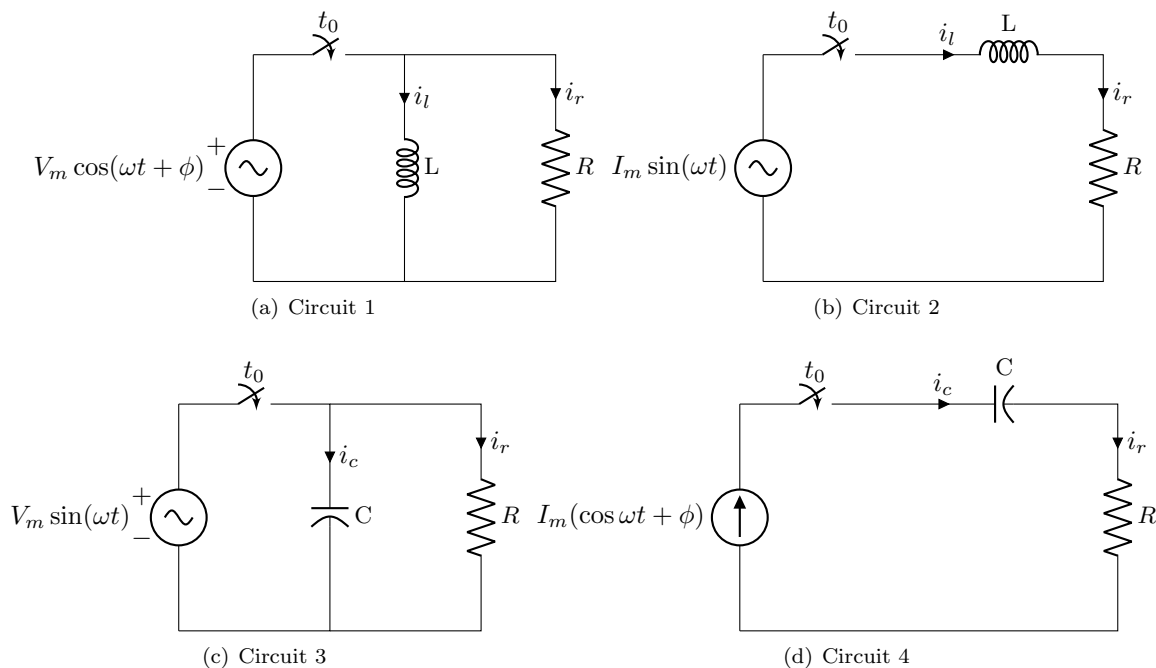


Fig. 1: Simple first order circuits (Question 1)

2. (4 points) Consider the Op-Amp circuit shown in Fig. 2. Derive the expression for load voltage $v_l(t)$, assuming the Op-Amp to be ideal.

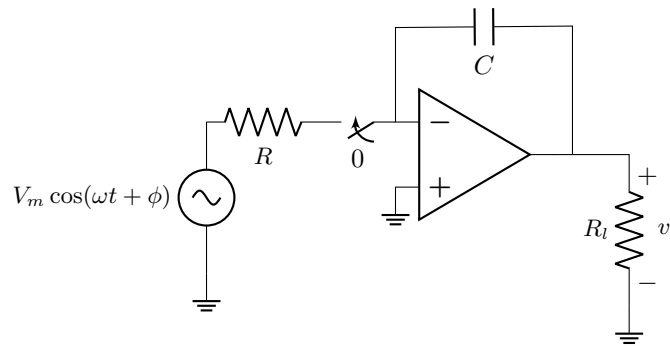


Fig. 2: Circuit with Op-amp (Question 2)

3. (8 points) Analyze the impulse response (i.e., the sinusoidal sources are replaced by impulses) of the circuits shown in Fig. 1(a) and Fig. 1(d).
4. (4 points) For the circuit shown in Fig. 3, compute the current through the inductor if $v(t) = e^{-2t}$ and $i(0^-) = 0$.

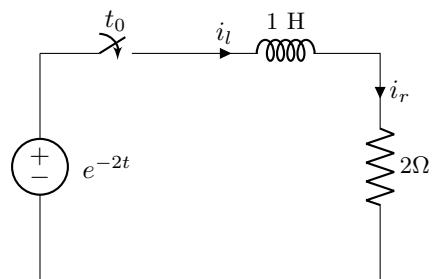


Fig. 3: Series RL circuit (Question 4)