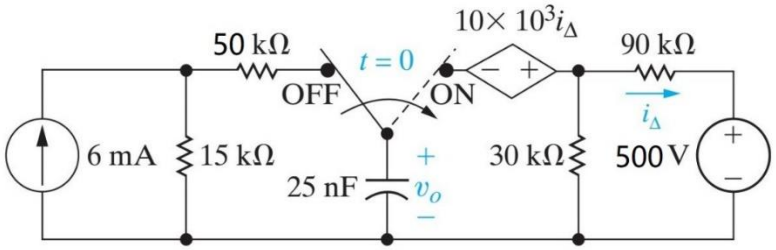
EE 111 Homework 4

Due date: Apr. 17^{th}, 2019
Turn in your homework in class

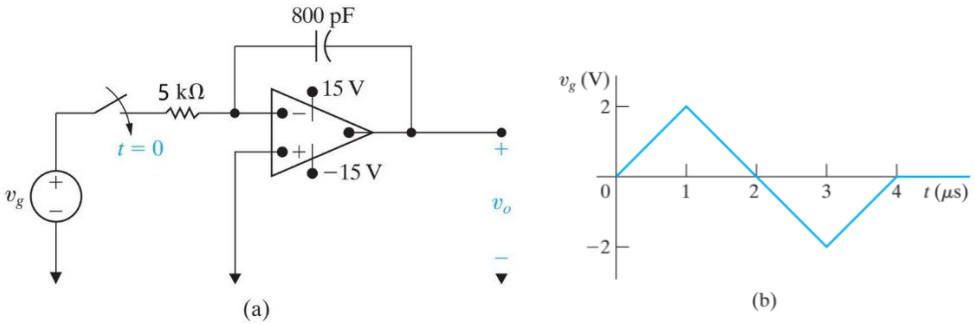
Rule:

- Work on your own. Discussion is permissible, but similar submissions will be judged as plagiarism.
- Please show all intermediate steps: a correct solution without an explanation will get zero credit.
- Please submit on time. No late submission will be accepted.
- Please prepare your submission in English only. No Chinese submission will be accepted.

1. The switch in the circuit shown in the figure has been in the OFF position for a long time. At t=0, the switch moves instantaneously to the ON position. Find $v_o(t)$ for t≥0.



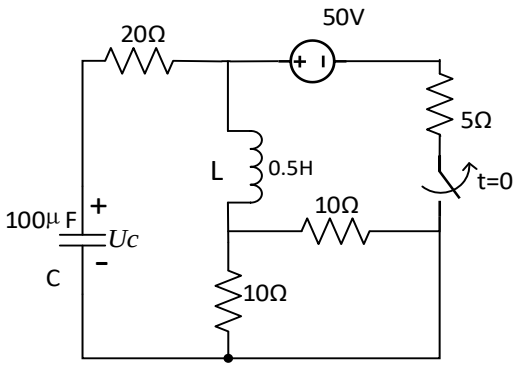
2. The voltage source in the circuit in the figure(a) is generating the triangular waveform shown in the figure(b). Assume the energy stored in the capacitor is zero at t=0 and the op amp is ideal. Derive the numerical expressions for $v_o(t)$ for the following time intervals: $0 \leqslant t \leqslant 1$ μs; 1 μs$\leqslant t \leqslant 3$ μs; 3 μs$\leqslant t \leqslant 4$ μs.



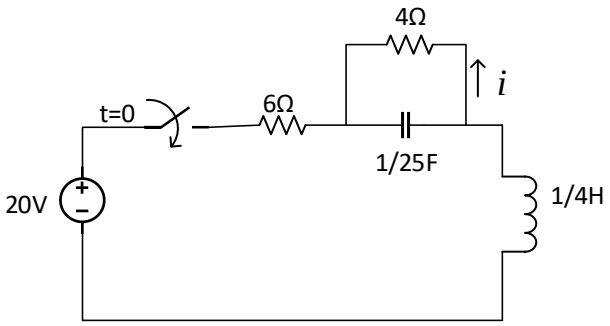
(a)

(b)

3. At t = 0, the switch is opened. Determine $Uc(t)$ in the circuit for t ≥ 0.



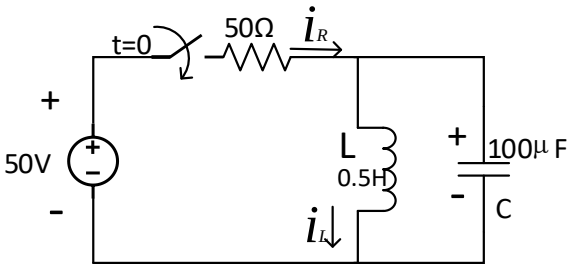
4. When t<0, no energy is stored in the capacitor nor the inductor in the circuit below, Find *i(t)* for $t \geq 0$.



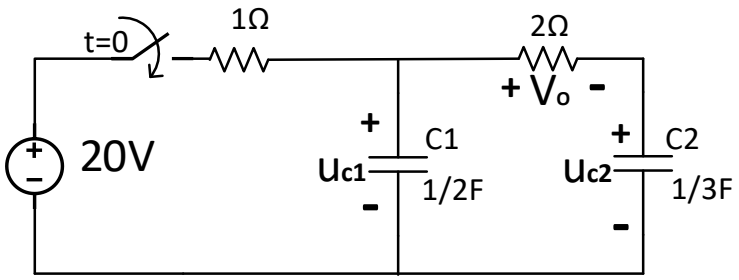
5. In the circuit below, let $i_L(0)=2A$, $u_c(0)=0$, please determine

a) $i_{L;}$

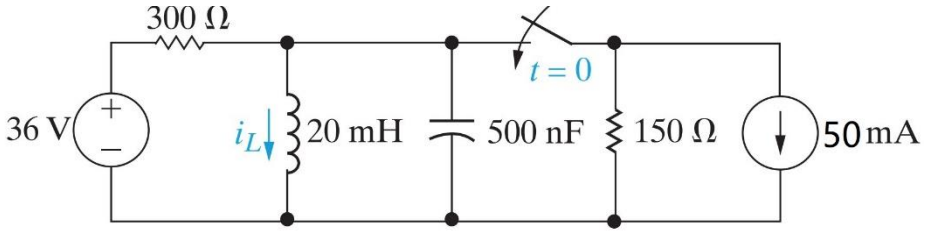
b) i_R



6. The initial capacitor C1 voltage is 20V and the initial capacitor C2 voltage is 29 V. For t>0, obtain $V_O(t)$ in the circuit of below.



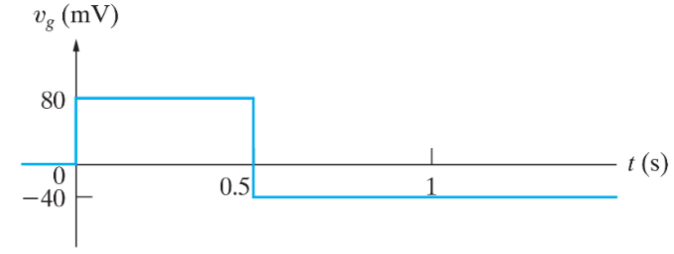
7. The switch in the circuit has been open a long time before closing at t=0. Find $i_L(t)$ for $t \geqslant 0$.



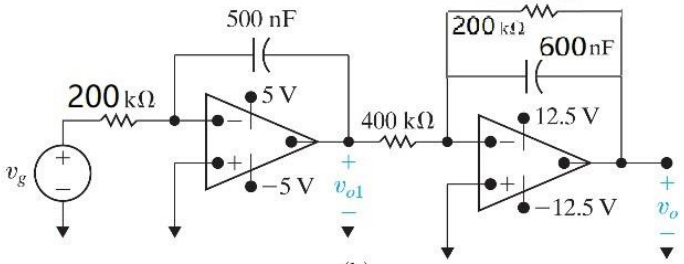
8. The voltage signal of Fig.(a) is applied to the cascaded integrating amplifiers shown in Fig.(b). There is no energy stored in the capacitors at the instant the signal is applied.

a) Derive the numerical expressions for $v_o(t)$ and $v_{o1}(t)$ for the time intervals $0 \leq t \leq 0.5$ s and $0.5\text{ s} \leq t \leq 2$ s.

b) Determine which operational amplifier firstly enters its saturation mode from linear mode and find the moment $\mathbf{t_{sat}}$ the transition occurs.



(a)



(b)