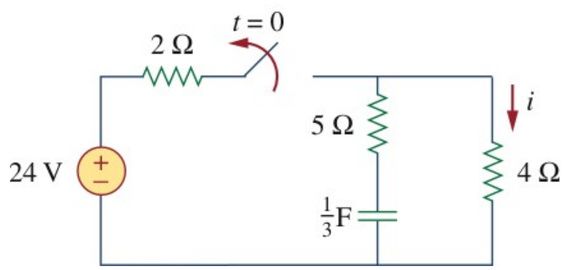
1: First order review

For the following circuit, find $i(t),\ t > 0.$

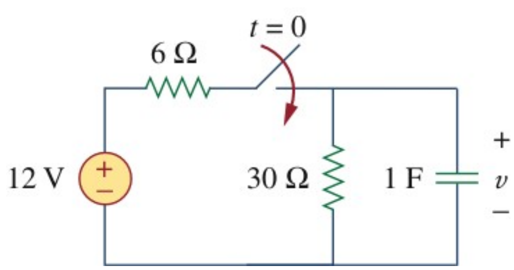


2: First order review

In the previous circuit, assume that the switch is operated in the opposite direction and *closes* at $t = 0.$ Find $i(t), t > 0.$

3: First order review

In the following circuit, find $v(t), t > 0$. Then find the current, $i(t)$, across the 30Ω resistor for $t > 0.$ What do you notice about the form of $v(t)$ and $i(t)$?



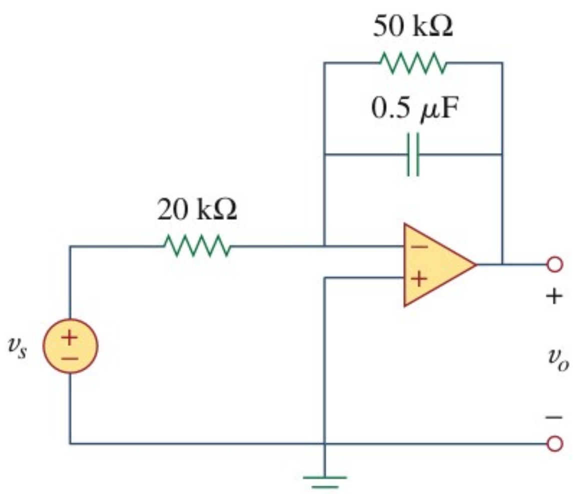
4: First order review

Repeat the previous problem, assuming that the switch has been closed a long time and opens at $t = 0.$

5: First order op amp DO NOT PANIC!

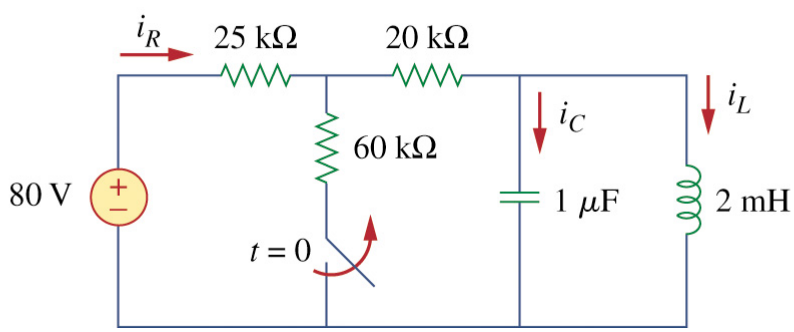
For the op-amp circuit shown here, assume that
$v_s(t) = 0$ for $t < 0$ and suddenly jumps to 1V at $t = 0$. Compute $v_0(t)$.

Hint: For a capacitor circuit, the initial condition is the voltage across the capacitor at $t = 0^-$.
Hint: Do Not Panic. Remember the 2 facts you know about an ideal op-amp. Then work from there.



7: Second order initial conditions

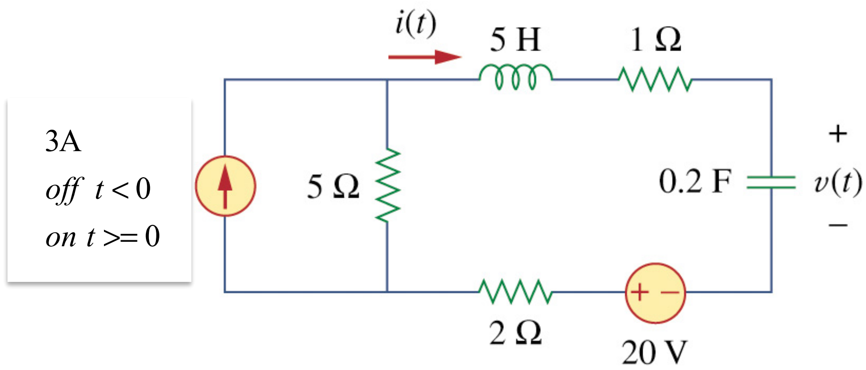
Find $i_R(0^+), i_L(0^+), i_C(0^+), di_R(0^+)/dt, di_L(0^+)/dt, di_C(0^+)/dt, i_R(\infty), i_L(\infty), i_C(\infty)$ (9 initial and final conditions). This problem is the equivalent of three initial condition problems. *Hint: The resistor has no associated differential equation, but* <u>*all*</u> *of the currents and voltages have the same form. Use KCL & KVL as appropriate. Take your time and work through it.*



8. Second order initial conditions

The 3A source is OFF (0 A) for $t < 0$ and suddenly turns on at $t = 0$. (This is essentially $3u(t)$ V).

Obtain the initial and final conditions necessary to solve for $v(t)$ and $i(t)$ for $t > 0$.



9. Second order solution

Find $v(t), t > 0$ in the previous circuit. *Hint: Is it serial LRC? How is it damped?*