Chapter 8 Homework:

1. For the circuit below,
2. Determine the second order differential equation governing *v(t)*.
3. Find R so that the circuit is critically damped.



1. For the circuit below,
2. Determine the differential equation that governs *vC(t), t>0*.
3. Is the system under, over, or critically damped?



1. For the circuit below,
2. Determine the differential equation for *iL(t), t>0.*
3. Determine the initial (t=0+) and final (t→∞) conditions on *vC(t)* and *iL(t).*



1. The switch moves from position A to position B at t=0 seconds.
2. Determine the differential equation that governs *iL(t), t>0*.
3. Determine initial (t=0+) and final (t→∞) conditions on *vC(t)* and *iL(t).*



1. For the circuit below,
2. Determine the differential equation governing *i(t)*.
3. Determine ζ and ωn
4. Find the maximum value of current through the resistor in response to a step input
*u(t) =* *3u0(t)* A.



1. A current in a second order circuit is described by the differential equation

$$\frac{d^{2}i(t)}{dt}+6\frac{di(t)}{dt}+100i\left(t\right)=50u\_{0}(t)$$

1. Determine the damping ratio, undamped natural frequency, and damped natural frequency for the circuit.
2. Sketch the response of the circuit to a unit step input. Include numerical values for *tr*, the maximum value of *i(t)*, and the steady-state value of *i(t).*
3. For the circuit below, determine
4. The differential equation for *iL(t), t>0.*
5. The initial (t=0+) and final (t→∞) conditions on *vC(t)* and *iL(t).*



1. The switch moves from position A to position B at t=0 seconds.
2. Determine the differential equation that governs *vC(t), t>0*.
3. Determine initial (t=0+) and final (t→∞) conditions on *vC(t)* and *iL(t).*



1. The switch moves from position A to position B at t=0 seconds.
2. Determine the differential equation that governs *vC(t), t>0*.
3. Determine initial (t=0+) and final (t→∞) conditions on *vC(t)* and *iL(t).*



1. The differential equation governing a voltage *vout(t)* in a circuit is:



Determine the maximum value of *vout(t)* resulting from a step voltage input
 .

1. For the circuit below, determine
2. The differential equation for *iL(t), t>0*
3. The initial (t=0+) and final (t→∞) conditions on *vC(t)* and *iL(t).*

