Announcements

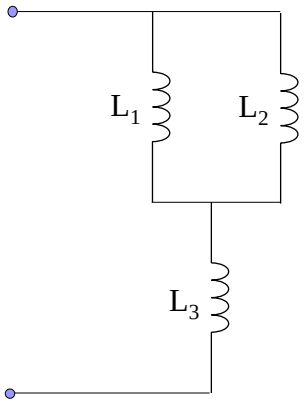
- Attend only your second lab slot this week and next week.
- HW #3 online today.
- Review session next Monday 5-8pm. Location TBD.
- Midterm #1 next Tuesday 12:00-1:30. Location TBD.

Lecture #7

OUTLINE

- **Review and examples**
  - **1st and 2nd Order Circuits**
  - **Phasors**
  - **Complex impedence**

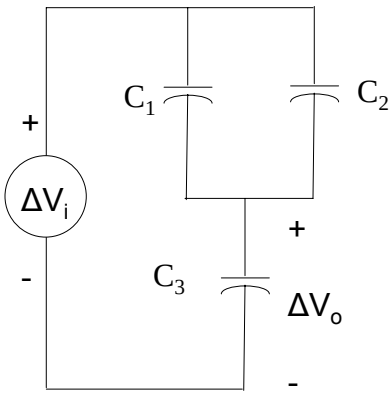
Equivalent inductance



$\mathbf{L_{eq} = ?}$

$\mathbf{Z_{eq} = ?}$

Equivalent Capacitance and Voltage Division

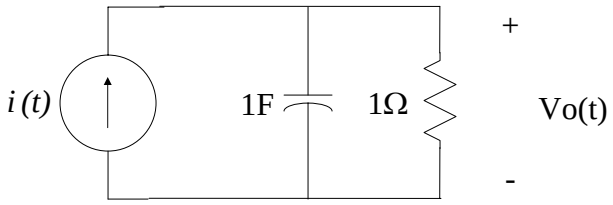


$\mathbf{C_{eq} = ?}$

$\mathbf{Z_{eq} = ?}$

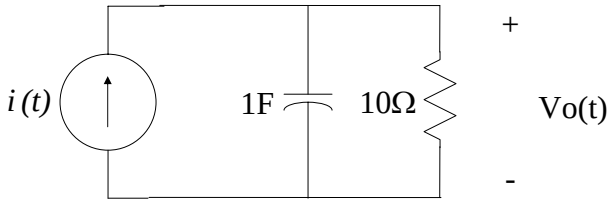
$\mathbf{\Delta V_o = ?}$

1st Order Circuit Example 1



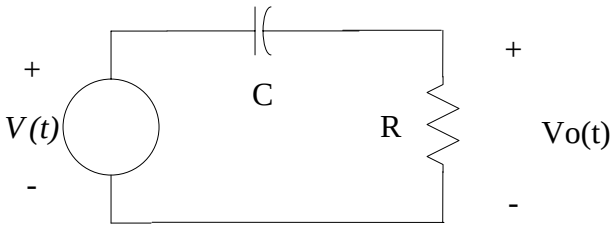
- Find Vo(t) knowing i(t) = u(t), the unity step function.
- Plot the Vo(t), i(t), $E_{capacitor}(t)$

1st Order Circuit Example 2



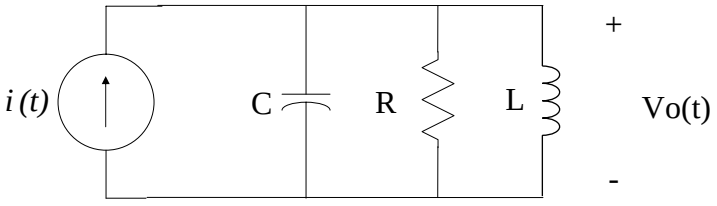
- Find Vo(t) knowing i(t) = u(t)/10, the unity step function
- Plot the Vo(t), i(t), $E_{capacitor}(t)$

1st Order Circuit Example 3



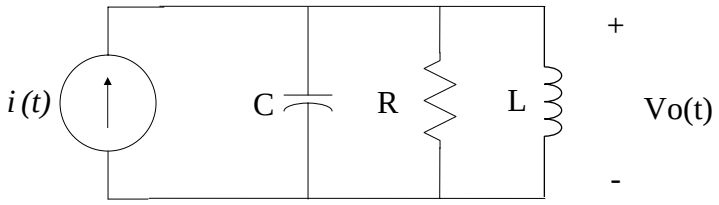
- Find Vo(t) knowing i(t) = Acos(ω_ot) + u(t)

2nd Order Circuit Example 1



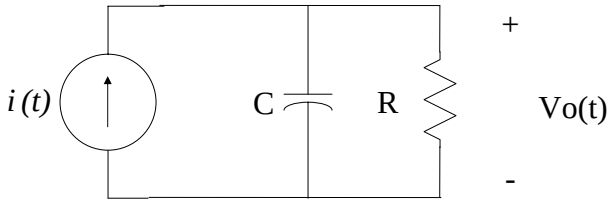
- Find the damping factor and the natural frequency of this circuit.

2nd Order Circuit Example 2



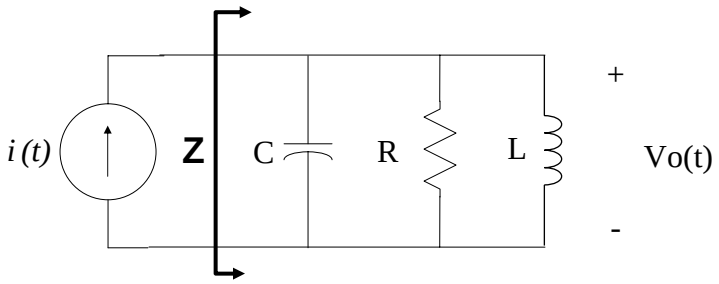
- Find Vo(t) knowing i(t) = u(t)

Phasor Example 1



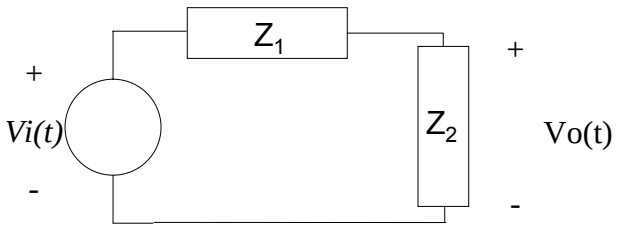
- Find Vo(t) knowing i(t) = cos(ωt)
- Plot Vo(jω)/i(jω)

Phasor Example 2



- Find the total equivalent impedance **Z** of the circuit.
- Find Vo(jω)/i(jω)
- At what frequency is the impedance purely real?

Complex Impedence Example 1



-Find Vo(t)/Vi(t)
-Find the usable power transfer ratio Po/Pi
-Knowing Z_2, choose Z_1 such that Po/Pi is max