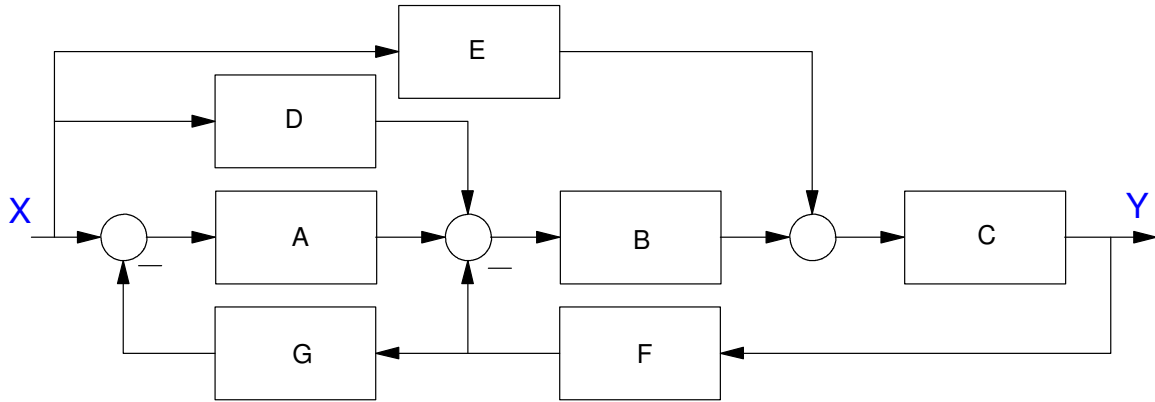


Homework #5: ECE 461/661

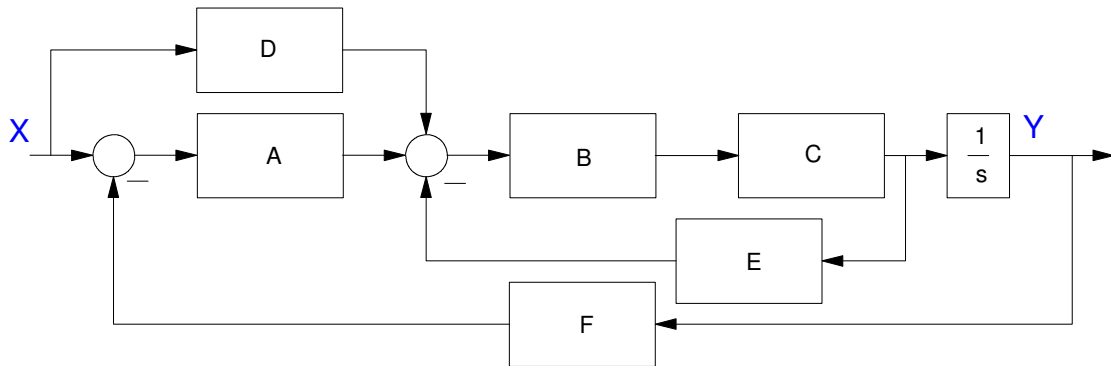
Block Diagrams, Canonical Forms, Electrical Circuits. Due Monday, September 23rd

Block Diagrams

1) Determine the transfer function from X to Y



2) Determine the transfer function from X to Y



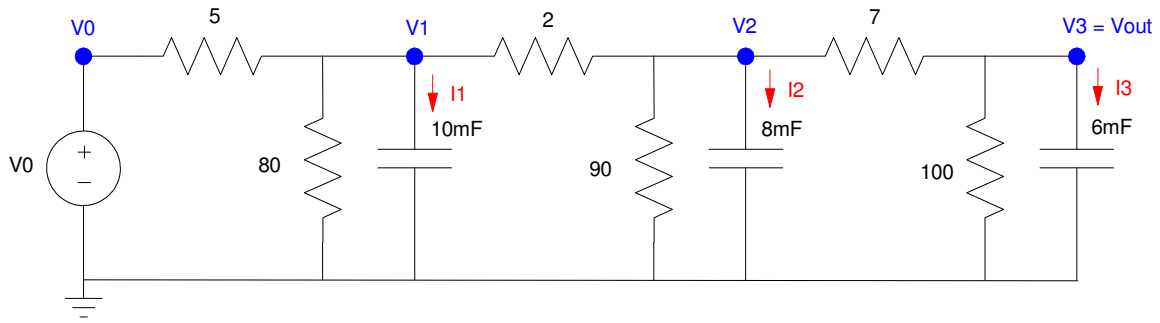
Canonical Forms

3) Give two different state-space models that produce the following transfer function

$$Y = \left(\frac{s+30}{s(s+2)(s+10)} \right) U$$

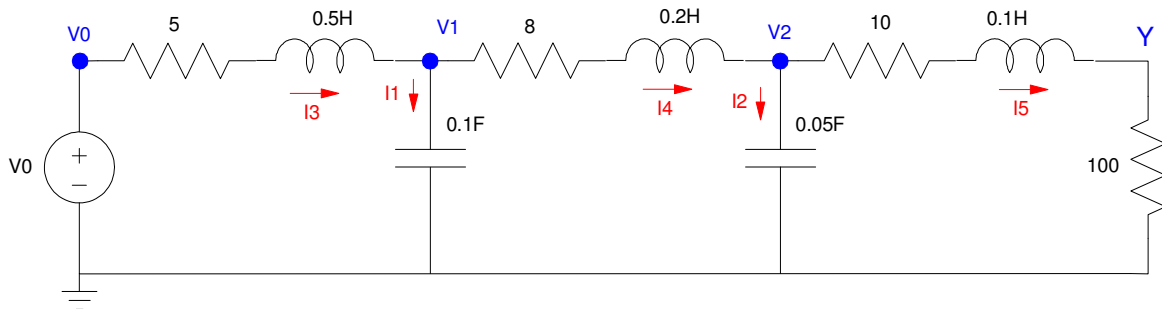
Electrical Circuits

- 4) Using state-space methods, find the transfer function from V_0 to V_3
- 5) Using state-space methods, find the transfer function from V_0 to V_1



Problem 4 & 5

- 6) Express the dynamics for the following RLC circuit in state-space form.
 - Find the transfer function from V_0 to V_3
- 7) Assume $V_0 = 0$. Specify the initial conditions so that $V_3(0) = 1V$ and
 - The transients decay as slow as possible
 - The transients decay as fast as possible



Problem 6 & 7