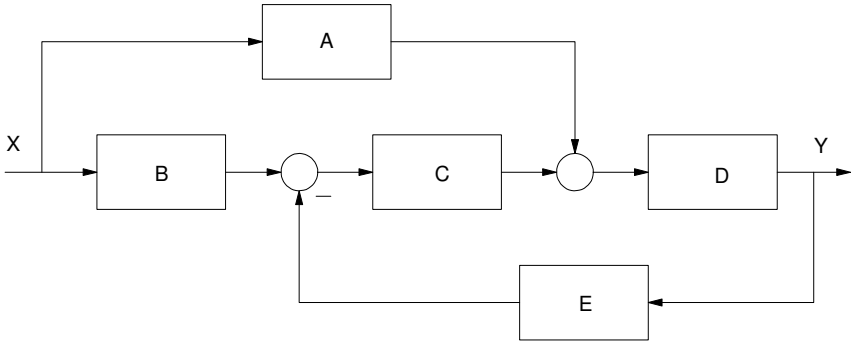
Homework #4: ECE 461/661

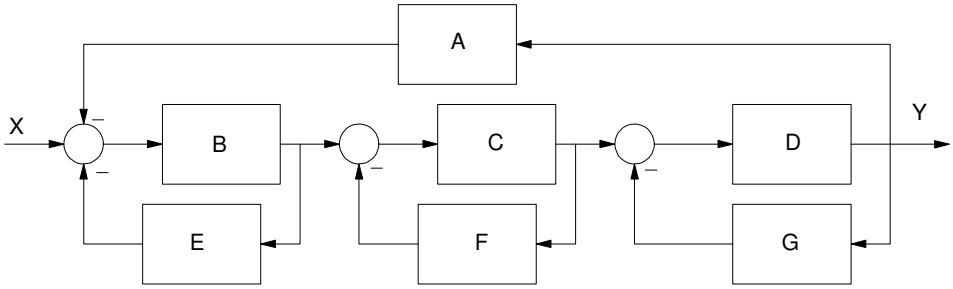
Block Diagrams, Canonical Forms, Electrical Circuits. Due Monday, September 21st

Block Diagrams

1) Determine the transfer function from X to Y



2) Determine the transfer funciton from X to Y



Canonical Forms

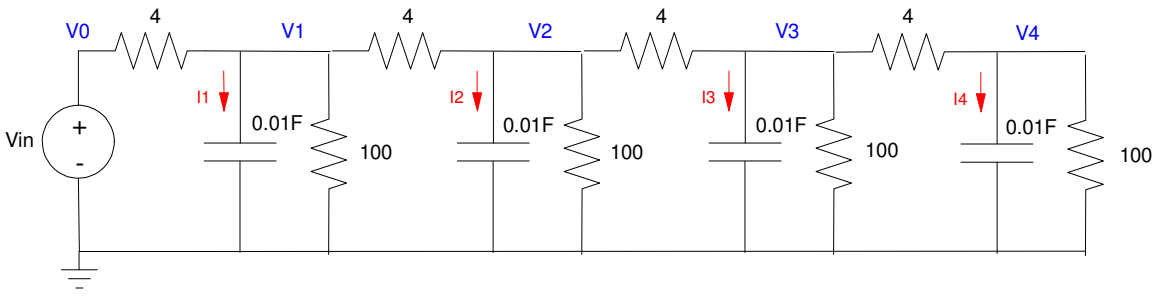
3) Give two different state-space models that produce the following transfer function

$$Y = \left(\frac{200(s+5)}{(s+2)(s+3+j5)(s+3-j5)} \right) U$$

Electrical Ciruits

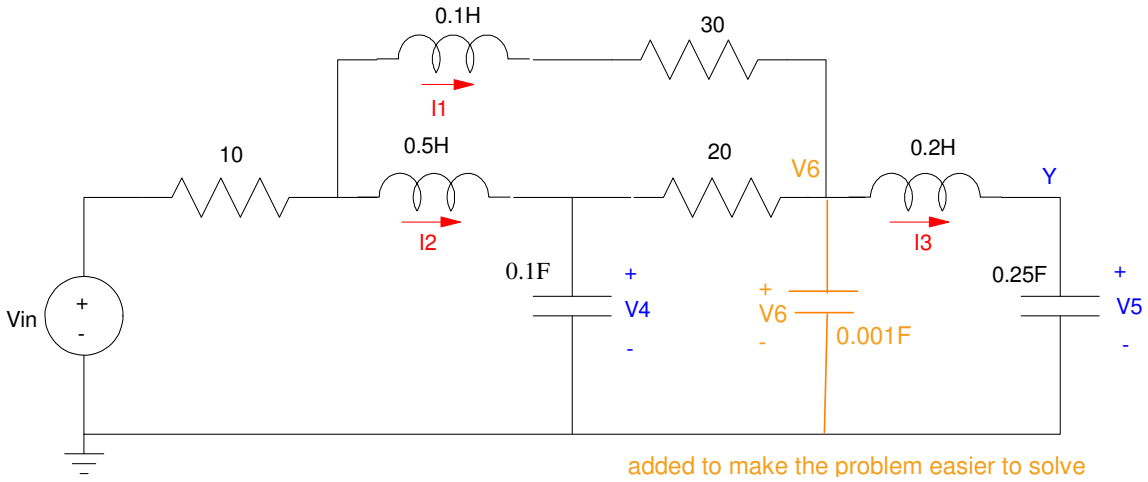
4) Using state-space methods, find the transfer function from Vin to V4

5) For the previous RC filter, find the transfer function from Vin to V3



6) Express the dynamics for the following RLC circuit in state-space form.
   - Find the transfr function from Vin to V5

7) Assime Vin = 0. Specify the initial conditions so that the total energy at t = 0 is 1.0 Joules and
   - The transients decay as slow as possible
   - The transients decay as fast as possible



Problem 6 & 7