ECE 447: Control Systems (Fall 2021)

Prof: Sam Burden TA: Sat Singh

today:
- ☐ logistics: HW1 due Fri Oct 15
  HW2 due Fri Oct 22
- ☐ group work
- ☐ break
- ☐ office hour

Prof Burden TODO:
- ☑ enable participant screen sharing
- ☑ advertise TA OH (currently virtual)
- ☑ clarify y_2 in HW1 p3a
- ☑ pdf or ipynb both OK

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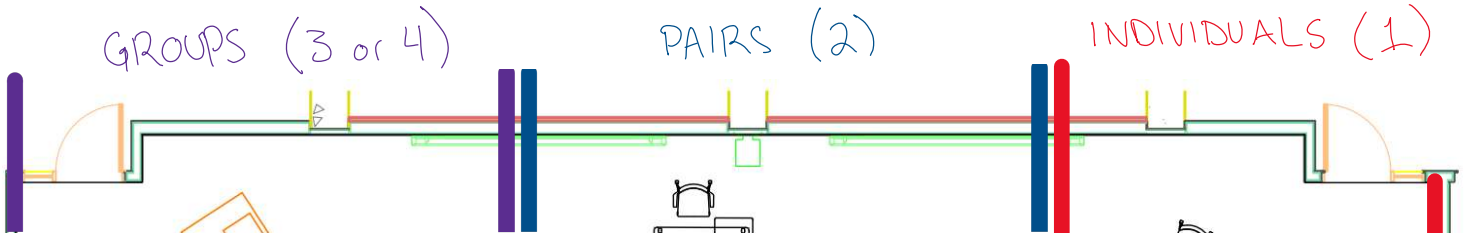
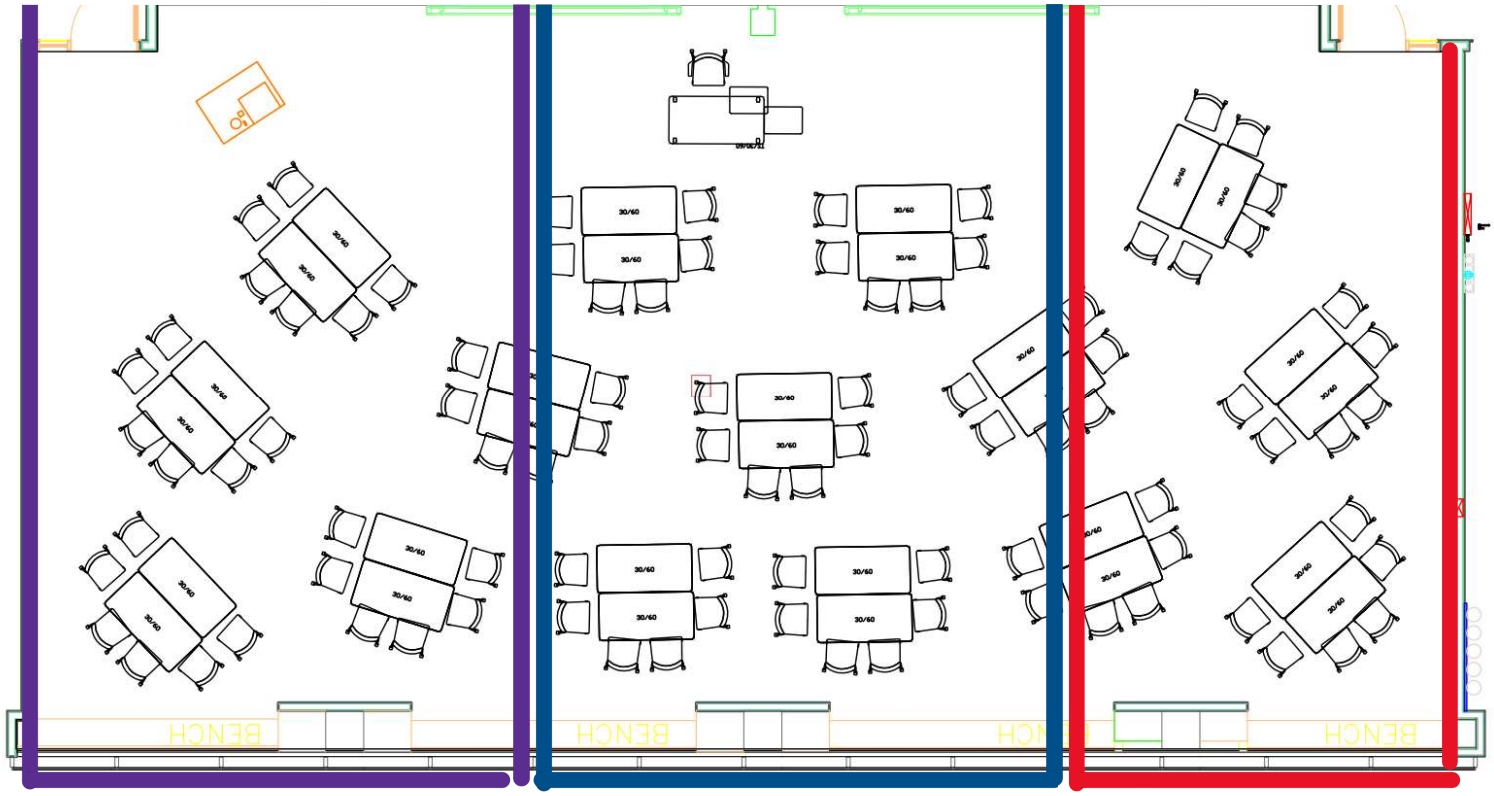
group work





1. RLC circuit interconnection

Consider the model of a series RLC circuit from lecture,

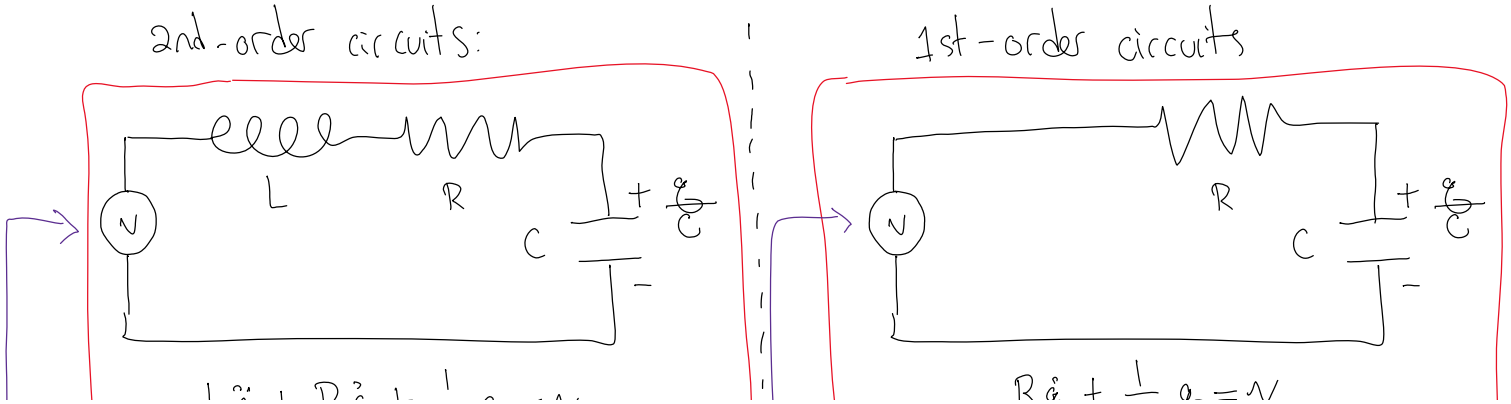
$$L\ddot{q} + R\dot{q} + q/C = v,$$

where q denotes the charge on the capacitor, (R, L, C) denote the (resistor, inductor, capacitor) parameters, and v denotes a series voltage source.

Now suppose that the input voltage v to the circuit above is actually the output from a second series RLC circuit

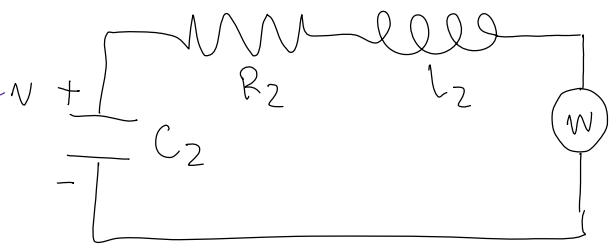
$$L_2C_2\ddot{v} + R_2C_2\dot{v} + v = w,$$

where v denotes the voltage across the second circuit's capacitor, (R_2, L_2, C_2) denote the second circuit's (resistor, inductor, capacitor) parameters, and w denotes a series voltage source for the second circuit.



$$L\ddot{q} + R\dot{q} + \frac{1}{C}q = v$$

$$L_2C_2\ddot{v} + R_2C_2\dot{v} + v = w$$



$$R\dot{q} + \frac{1}{C}q = v$$

$$R_2C_2 + v = w$$