

## Sticky note

Take 1 and write 3 topics you want me to review for exam.

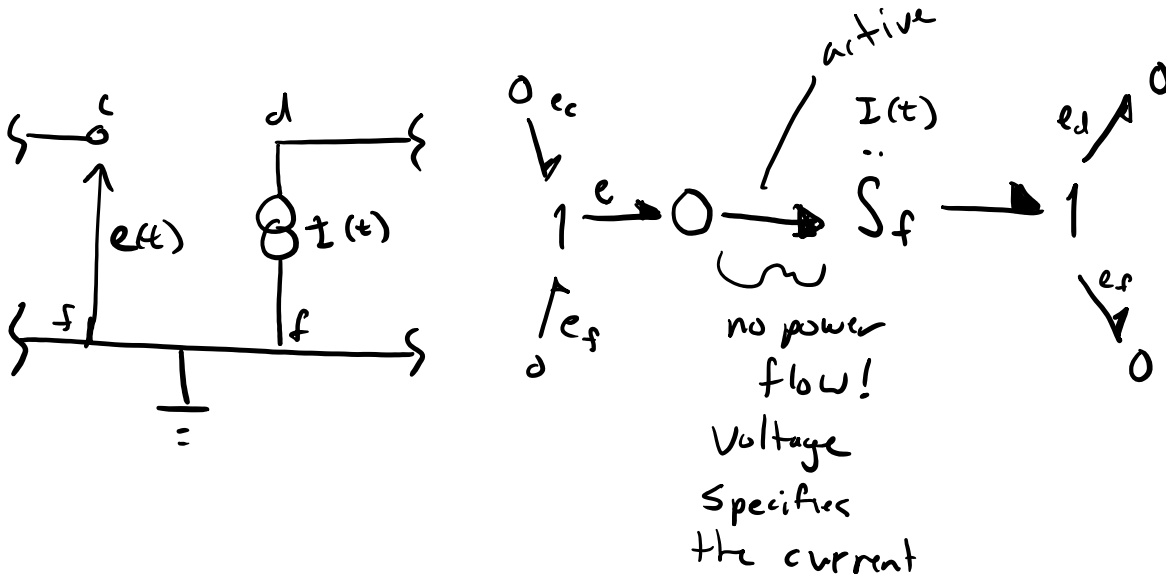
- HW 4 and Lab 2 due Friday
- Review session during Friday's lecture
- Lab report template and Lab 1 solutions posted today
- HW 1-3 solutions on Canvas
- HW 4 solutions posted Sat. morning.

## Midterm

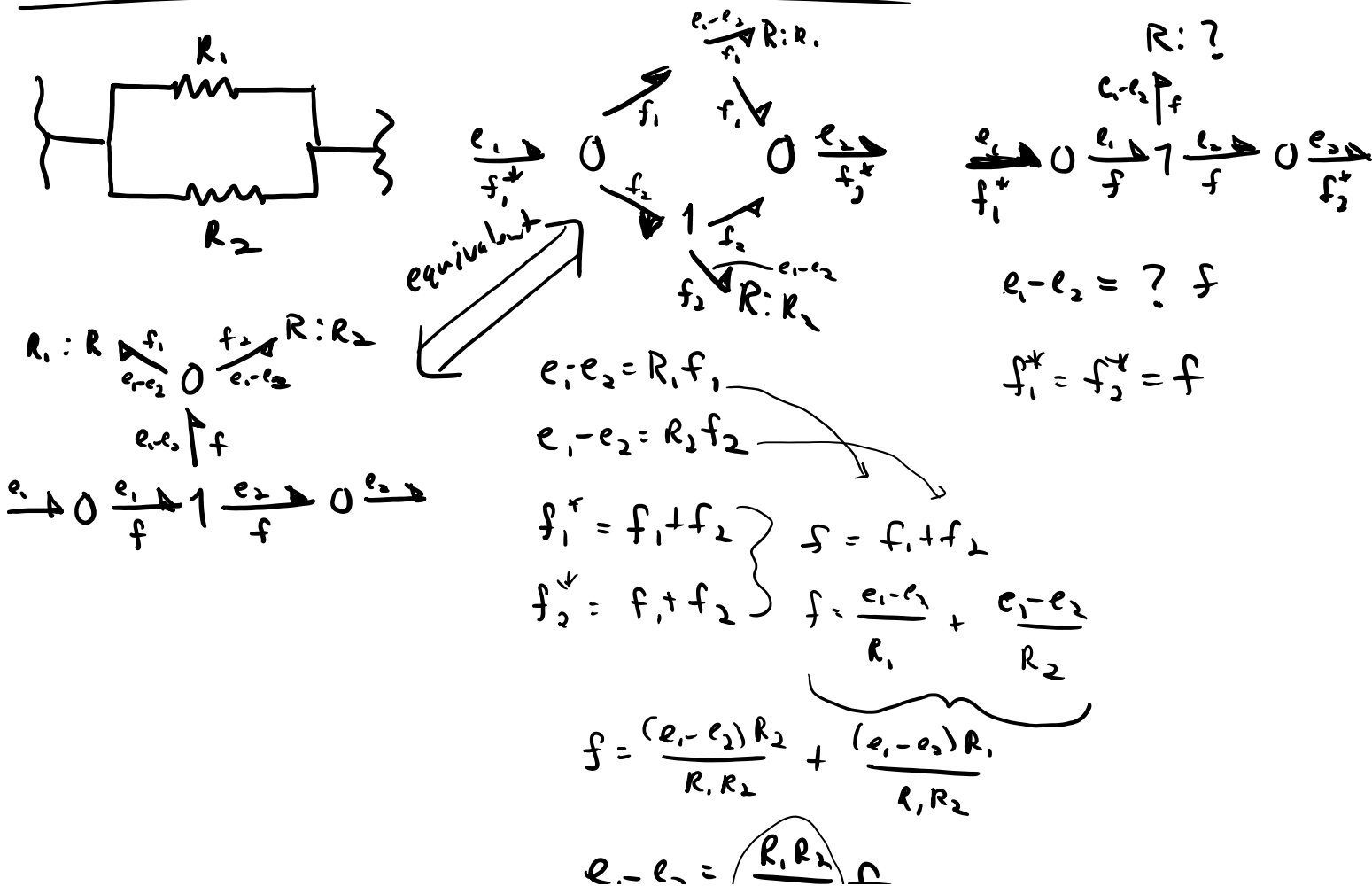
- Monday, Oct 28 3:10-4
- Open notes, but notes you have written, typed, or drawn yourself.
- No electronic devices (includes calculators, pads, phones, etc.)
- Materials covered
  - Book chapters 1 through 4.2.1 or .2
  - Lecture materials up to Oct 23rd
  - Lab 1
- Random seating chart
- Bags at front of room
- Use restroom before
- Will sign honor code reminder.

# Electrical Active Bonds

example voltage modulated by a current source



## Note on parallel and series circuits



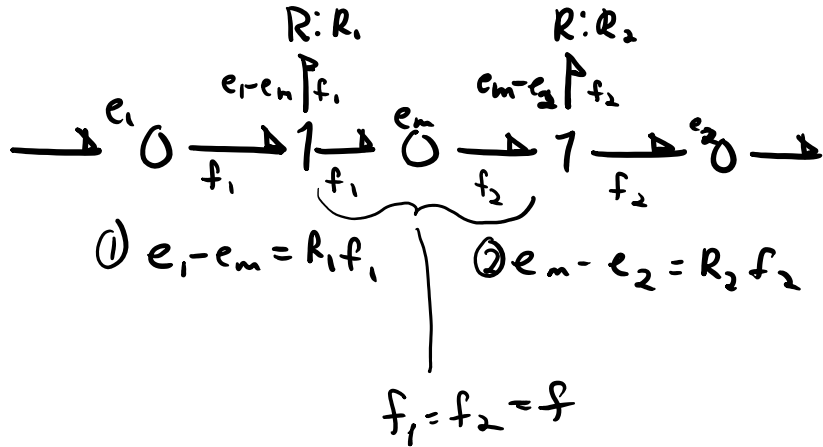
$$e_1 - e_2 = \frac{R_1 R_2}{R_1 + R_2} f$$

equivalent resistance

?

## Series

$$\{e_{R_1} \quad e_m \quad e_{R_2}\}$$

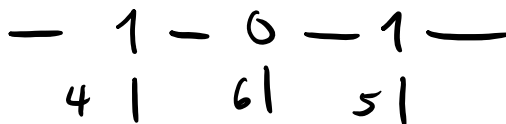
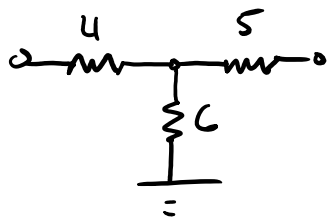
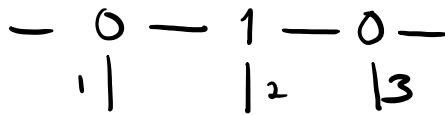
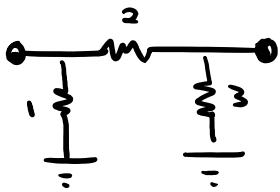


$$\text{①} + \text{②}$$

$$e_1 - e_2 = R_1 f + R_2 f$$

$$e_1 - e_2 = \underbrace{(R_1 + R_2)}_{\text{equiv. resistance}} f$$

Patterns emerges in the bond graphs.



## Mechanical Systems

masses, springs, dampers, levers, flywheels, gears, shaft, etc.

## Steps

1. Create a Free Body Diagram and specify positive absolute velocity directions and whether tension or compression of elements are positive.
2. Use 1 junctions to represent all velocities
3. Attach to 1-junction any element that relates to the absolute velocity ( $I, C, R, S_e$ )
4. Use 0-junctions to establish relative velocities
5. Eliminate bonds with zero velocity
6. Simplify the graph

## Example Lab 2 model

