Online Delivery Plan

Assessment

1. **Homeworks** – will proceed as normal
2. **Quizzes** – Assigned with homework, but grade contributes to Quiz category.
3. **Exams** – one-week, "take-home"
   - No online resources other than course website and textbook
   - MATLAB/LTSpice ok to use, but no credit unless otherwise stated
4. **Experiments** – Completed individually using MATLAB/LTSpice. No prelab. Reduced to two labs (total)

Online Delivery Plan (2)

Content Delivery

1. **Lectures –** Zoom livestream and recording
2. **Lecture Q&A –** Slido during livestream
3. **Office Hours** – Zoom, Slack, Canvas, e-mail
   - Additional meetings by appointment
4. **Collaboration** – Slack, Canvas

Additional Resources

Communication

- Contacting me
  - Anytime, through e-mail, Slack, Zoom (OH/Lectures), Slido (Lectures), Canvas, Phone (schedule)
  - Contact me if you need help with course material, need help adjusting to working from home, are stressed, need to talk, or anything else.
- Contacting peers
  - Please register and use the Slack channel
    - http://utk-ece202.slack.com/
  - Centralized communication that every student can see
  - No possibility of negative impact to your grade for anything posted on Slack

Resources

- University and College Update Sites
  - https://www.utk.edu/coronavirus/students/
  - https://tickle.utk.edu/coronavirus/
    - Links to companies offering 2 months of free internet / removed data caps
- University Technology Request Form
  - https://forms.utk.edu/tech-request/
    - Request a laptop and/or hotspot through OIT
- CDC guidance on Covid-19
  - https://www.cdc.gov/coronavirus/2019-ncov/prepare/prevention.html
- Tips for Emotional Wellness
  - https://www.utk.edu/coronavirus/faq/#feeling-worried-about-coronavirus-covid-19

Upcoming

- (Tentative) modifications to drop deadline and ability to change enrollment to S/NC

Course Content

- Magnetically Coupled Circuits (Ch 13)
- Sinusoidal Steady-State Analysis (Ch 10)
- AC Circuit Power Analysis (Ch 11)
- Circuit An Analysis in the s-Domain (Ch 14)

Covered

- Frequency Response (Ch 15)
- Fourier Circuit Analysis (Ch 17)

Need to be Covered

- Two-Port Networks (Ch 16)
- Polyphase Circuits (Ch 12)

As time permits

Quiz #2 – Common Mistake

- Average: 79, Max: 100, Median: 85
- Mistakes: Algebra

$$s^2 + a_1 s + a_0 = (s - p_1)(s - p_2), \qquad p_{1,2} = \frac{-a_1 \pm \sqrt{a_1{}^2 - 4a_0}}{2}$$

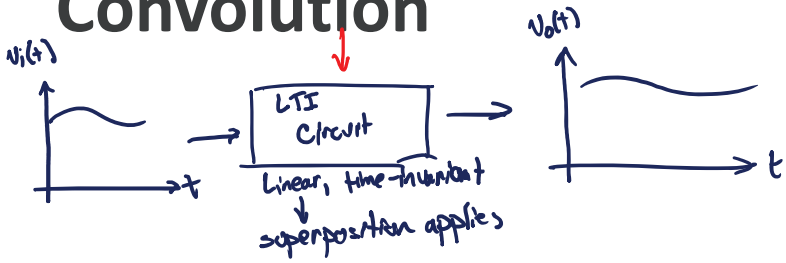
$a_2 \neq 1$

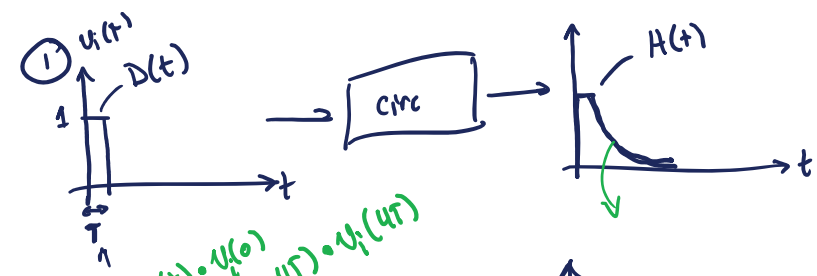
$$a_2 s^2 + a_1 s + a_0 \neq (s - p'_1)(s - p'_2), \quad p'_{1,2} = \frac{-a_1 \pm \sqrt{a_1{}^2 - 4a_2 a_0}}{2a_2}$$

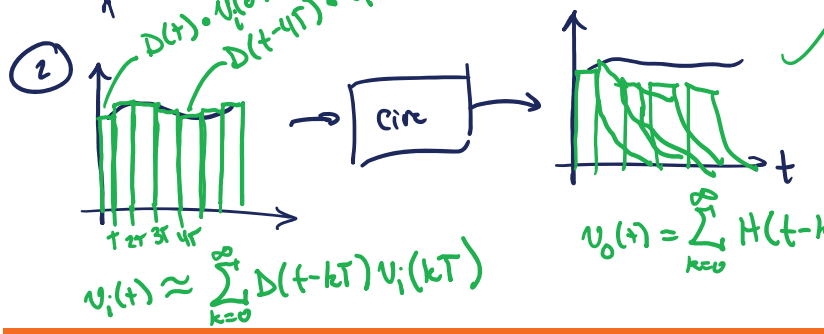
$$a_2\left(s^2 + \frac{a_1}{a_2}s + \frac{a_0}{a_2}\right) = \boxed{a_2}(s - p'_1)(s - p'_2),$$

$$p'_{1,2} = \frac{-\frac{a_1}{a_2} \pm \sqrt{\frac{a_1{}^2}{a_2} - 4\frac{a_0}{a_2}}}{2} = \frac{-a_1 \pm \sqrt{a_1{}^2 - 4a_2 a_0}}{2a_2}$$

Convolution







$$v_i(t) \approx \sum_{k=0}^{\infty} D(t-kT)\, v_i(kT)$$

$$v_o(t) = \sum_{k=0}^{\infty} H(t-kT)\, v_i(kT)$$

Let $T \to \emptyset$

$$v_i(t) = \int_0^{\infty} \delta(t-\tau)\, v_i(\tau)\, d\tau$$

$$\boxed{\begin{aligned} v_o(t) &= \int_0^{\infty} h(t-\tau)\, v_i(\tau)\, d\tau \\ &= \int_0^{\infty} h(\tau)\, v_i(t-\tau)\, d\tau \\ &= h(t) * v_i(t) \end{aligned}}$$

Convolution integral

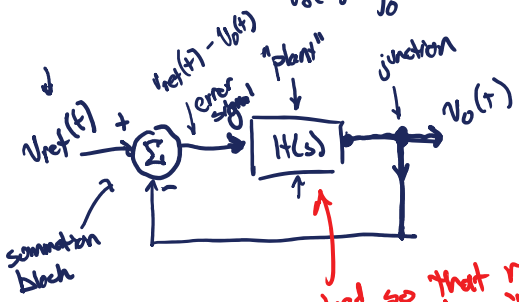
Formally, convolution goes $\int_{-\infty}^{\infty}$, but for Laplace $v_i(t) = 0$ for $t < 0$

& $h(t)$ must be $= \emptyset$ for $t < \emptyset$ if the system is causal

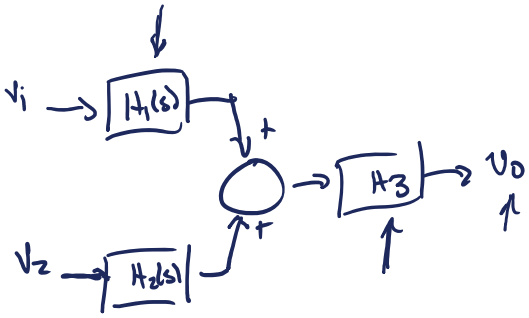
Block Diagrams

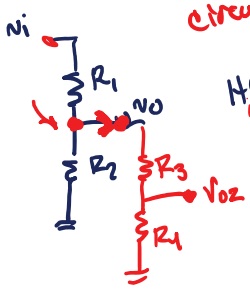
Directional

$$v_o(t) = \int_0^\infty h(t-\tau)\, v_i(\tau)\, d\tau$$



solved so that remaining circuit doesn't load it





$$H_1(s) = \cancel{\frac{R_2}{R_1+R_2}}$$

$$H_2 = \frac{R_4}{R_3+R_4}$$

$$V_{o2} \neq H_2\left(H_1 V_i(s)\right)$$