



JOINT INSTITUTE
交大密西根学院

Ve216 spring 2018

Lab Introduction 1

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Apr. 8, 2018

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Outline



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- Time Arrangement
- Tasks Before & After Lab
- Lab Report Requirements
- Grading Policy
- Lab One Content

Time Arrangement



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- Section 1: Wednesday 18:00-21:00
- Section 2: Thursday 9:00-12:00
- Section 3: Thursday 18:00-21:00

Tasks Before&After Lab



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- 2 or 3 students form one term, find your lab-mates before lab.
- Pre-lab report is required individually (**handed in at lab**).
- One post-lab report is required for each group with teamwork (**handed in at next lab**).

Lab Report Requirements



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- Contents to be included in your pre-lab report
 - Solutions for pre-lab exercises

- Contents to be included in your post lab report
 - Objectives
 - Theoretical background
 - Experiment procedures
 - Results (Figures)
 - Error analysis (Comparison with theoretical results)
 - Conclusion

- No late lab reports will be accepted !

Grading Policy



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➤ Labs will take 15% of overall grading

- 5% for each lab
- 3% depends on your in-lab performance
 - ✓ Attendance
 - ✓ Finish the experiment process
- 2% depends on your pre/post lab report
 - ✓ All detailed experiment procedural instructions are to be posted

➤ Function Generator

- Signals of $u(t)$, $\delta(t)$, $r(t)$, $\sin(t)$
- Frequency
- Magnitude
- Ground

Lab One Content



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➤ Oscillator

- Suitable for figure cutting
- Auto !
- Cursor
- Ground

➤ Breadboard

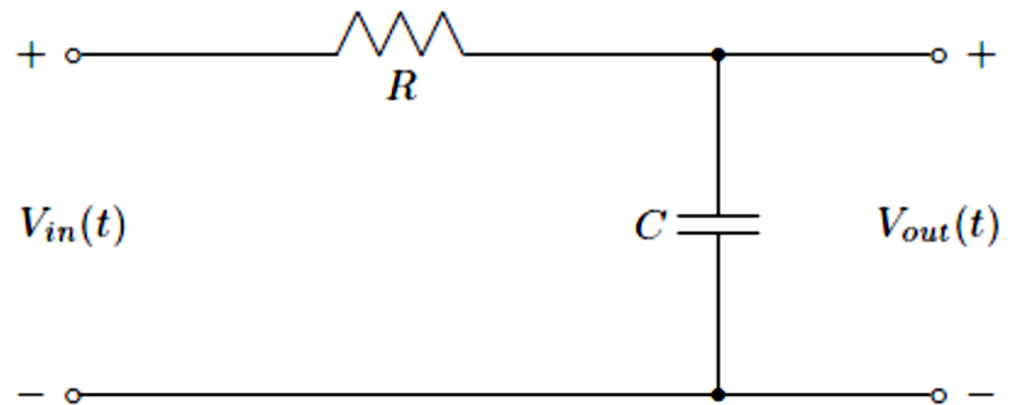
Lab One Content



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➤ RC circuit

- Step response
- Pulse response
- Ramp response
- Sine response



$$RC \frac{dV_{out}(t)}{dt} + V_{out}(t) = V_{in}(t)$$

$$V_{out}(t) = V_0 e^{-\frac{t}{RC}} + \int_0^t \frac{1}{RC} e^{-\frac{t-\tau}{RC}} V_{in}(\tau) d\tau, \quad t \geq 0$$

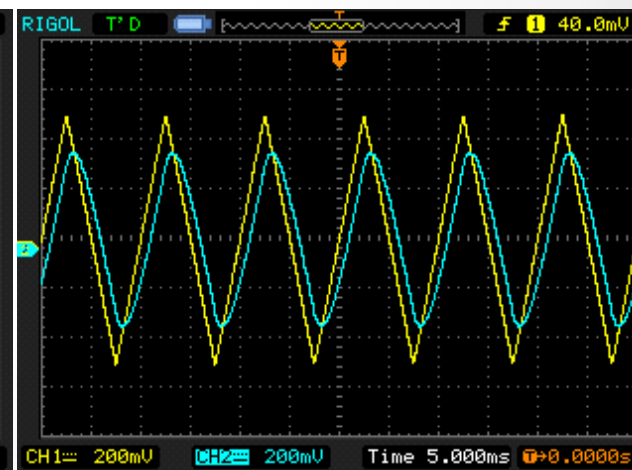
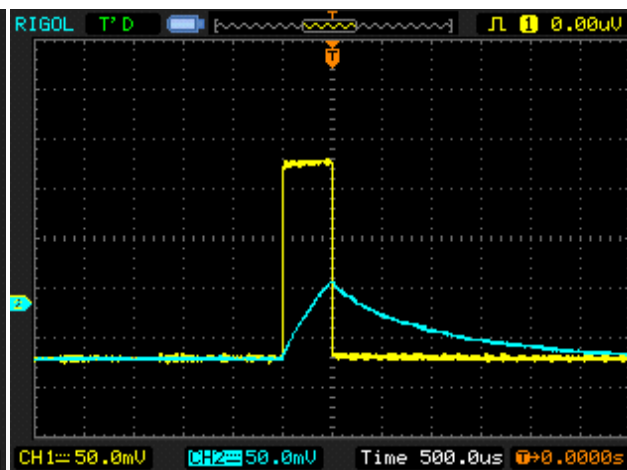
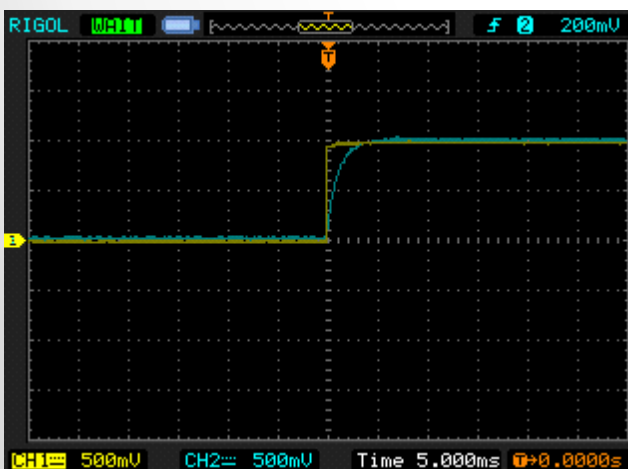
Lab One Content



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➤ RC circuit

- Step response $y_{step}(t) = (1 - e^{-\frac{t}{RC}})u(t)$
- Pulse response
- Ramp response



➤ RC circuit

- Sine response

- ✓ $V_{in}(t) = A \sin(\omega t)$

- ✓ $V_{out}(t) = A |H(j\omega)| \sin(\omega t + \angle H(j\omega))$

- ✓ $\omega = 2\pi f_c$

- ✓ measure $\angle H(j2\pi f_c)$ & $|H(j2\pi f_c)|$

- ✓ $2\pi f_c \tau_d = -\angle H(j2\pi f_c)$, calculate time delay: τ_d



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Q&A

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