Lab1: Rectifier Circuits
a) Half Wave Rectifier with RC filter

Rectifier Circuits
• For this experiment consider diode to be a switch.
• For ideal diode
  \( V_d > 0 \), the switch is closed and diode conducts like a short circuit
  \( V_d < 0 \), the switch is open and diode does not conduct, just like an open circuit.

• Practical diode:
  \( V_d > V_{on} = 0.7V \) (Silicon). After this voltage diode start conducting.
• Expected waveform without capacitor in the circuit
• Diode conducts in only positive half cycle and hence voltage appears at load resistance.

Fig. 1 Half wave rectifier

[Figure is taken from lab1 doc ECE-222]
• Adding capacitor to the previous circuit gives smoothing effect. It blocks DC and hence we get DC at load resistance.
• As value of capacitance increases, DC content will increase.
• Amount of AC present in DC is defined as ripple voltage, represented by $\Delta V$.
• Less ripple voltage is good, $\frac{\Delta V}{V_p} = T/RC$ [2]

Fig. 2 Capacitor effect in Half-wave rectifier [2]
b) Full Wave Rectifier using Centered-Tapped Transformer

- Inductance is directly proportional to square of turns.

Fig. 3 Full wave Rectifier

[Figure is taken from lab1 doc ECE-222]
In this experiment:

- Primary winding has N1 turns.
- Secondary Winding has N1/2 turns each.

For getting 10V at the output side, 20 V peak-to-peak is applied on the primary side.

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Fig. 4 Full wave rectifier [3]
References