Transformers

Equipment

- Protoboard Workstation
- Digital Oscilloscope
- Transformer

Objective

Learn how to use the digital oscilloscope

- Trigger on a transient signal
- Average signals

Understand operation of transformer Understand a half-wave and full-wave rectifier circuit.

Conceptual (C-level)

What signal do you get if you connect a 10:1 step-up transformer to a 9 volt battery?

Determine the effective resistance (the resistance the source "sees") for a load hooked through a transformer.

- Show how a purely resistive load is transformed
- Show how a purely reactive load is transformed

A step-up transformer increases the voltage on the secondary of the transformer. If he voltage increases by a factor of 8 how much does the power increase? (NOTE: P=IV)

Basic Lab (B-level)

Build a transformer.

- Measure the change in voltage.
- Determine the efficiency of your transformer.

Draw circuits for and then build the following rectifying circuits.

- Half-wave rectifier
 - \circ Measure and graph V(t) and compare to V_{RMS}
- Full-wave rectifier
 - \circ Measure and graph V(t) and compare to V_{RMS}

Advanced/Extended Lab (A-level)

- Decrease the ripple in your rectifying circuit.
 - Zener Diode
 - Capacitor
- How does the operation of a transformer and rectifying circuit change if the input source is a square wave or triangle wave instead of a sine wave?