

Impedance Matching and Transformation Lab

In this lab you will have to select components from “engineering stock”, in this case carbon film resistors. Please observe the absolute rule: **Never return used components to engineering stock**. There is no reason not to keep them in your personal or team “junk box”, but you should be able to count on any item fresh from engineering stock to be within its manufacturer’s specifications. Of course there can be no such guarantee for used components.

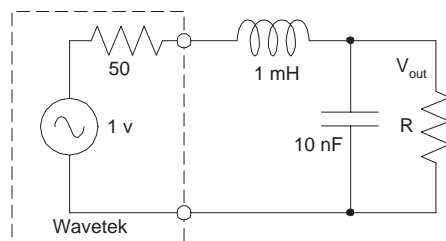
One other point to remember, even though you *should* be able to trust the integrity of fresh engineering stock items, you should not rule out bad components when trying to diagnose circuit misbehavior.

Engineering stock for this course is being provided from the MSL stock in Room 247. You will find this stock in the blue drawer cabinets in the middle of the lab, but these cabinets also contain non-stock items. Please take items only from the cabinets having UNC property labels **183925** and **183930**. Room 247 will be unlocked During “business” hours. Please plan your lab schedules accordingly.

Exercise 1: DC impedance matching.

Set up the generator to give a DC output of $V_{sig} = +1$ [V]. For this setting, connect various values of carbon film resistors, and determine the resistor value that consumes the greatest power (Hint: try resistors in the 20 to 200 [Ω] range). Power is an indirect measurement based on measurements your instruments can actually make. Using Ohm’s law and the formula for power, You should choose what measurements and calculations you will make to determine power.

Exercise 2: Matching a transformed AC impedance.



Build the following circuit on a protoboard and drive it with the Wavetek set at 1 [V_{pp}], sinusoidal. Without R_2 connected, set the frequency for maximum voltage measured at V_{out} , which should be near 50 [kHz]. Determine the resistor value that consumes the greatest power (Hint: try resistors in the 1 to 3 [k Ω] range).

Report: Summarize your results along with comments and observations.