

Lecture 4, Diode-Resistor Problems, Small Signal Diodes
E151/3 F17 – Matthew Spencer

1. Install LTSpice and perform a simulation of a series circuit comprised of a voltage source, a resistor and a forward biased 1N914 diode. Perform a DC sweep of the voltage source from 0.1V to 1.5V in steps small enough to generate a smooth curve and an outer sweep of the resistance value from 100 ohms to 500 ohms in steps of 100 ohms.

Plot the resulting I-V relationship with the curve for each resistor value overlaid on the same plot. You may use plots from LTSpice for this assignment, but it's generally better practice to export the data and operate on it in software which generates more visually appealing plots.

Include the LTSpice schematic you generated. Like the I-V relationship, you may take a screenshot from LTSpice for now. You should develop facility with some external circuit drawing tool (Visio and Illustrator are popular, I use Google Draw) because schematic entry programs produce schematics which are notoriously unreadable on slides.

2. Plot the differential resistance of the diode as well. You may need to export your data from LTSpice to another program to make this plot.

3. Use software of your choice to find a graphical/brute-force/guess-and-check solution to the same circuit for a voltage source of 1.15V and a resistor 326 ohms.

(optional) Also use software of your choice to implement an iterative solution to the circuit.