

# ECE 320 - Homework #1

MATLAB, Numerical Methods Due Monday, August 31st

For each of the following, solve

- a) Using graphical methods, and
- b) Using numerical methods.

Problem 1) Resistor - Diode circuit:

$$V = 10 - 1000I$$

$$I = 10^{-10} \left( \exp\left(\frac{V}{0.052}\right) - 1 \right)$$

Problem 2) Two diodes in series

$$V = 10 - 1000I$$

$$V = 0.052 \cdot \ln(1 + 10^{10} \cdot I) + 0.052 \cdot \ln(1 - 10^{10} \cdot I)$$

Problem 3) MOSFET Amplifier

$$I_d = 0.01 \cdot (9 - V_d)^2$$

$$V_d = 1000I_d$$

Problem 4) MOSFET Switch

$$I_d = 0.01 \left( 4 - \frac{V_d}{2} \right)^2 V_d$$

$$V_d = 10 - 10I_d$$