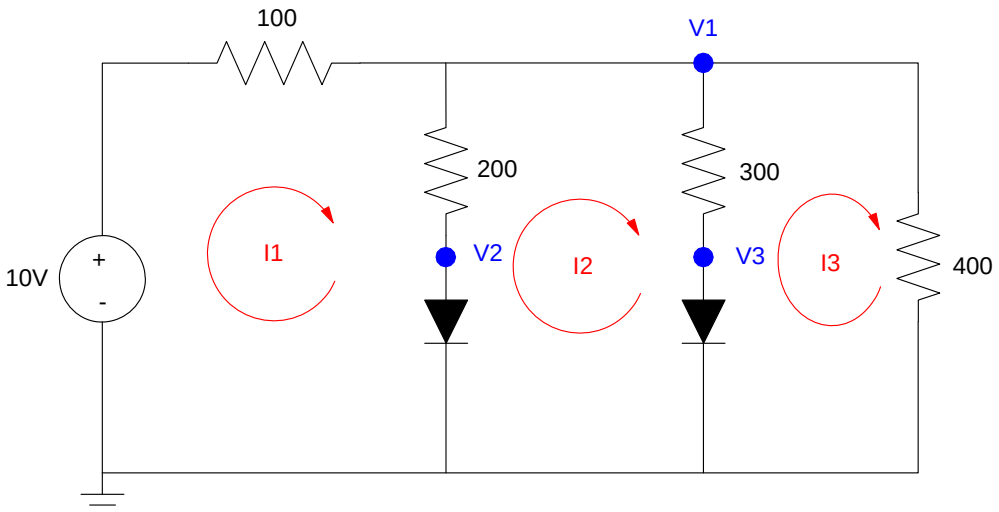
ECE 320 - Homework #3

Ideal Diode, LED, Clipper Circuits. Due Monday, February 1st

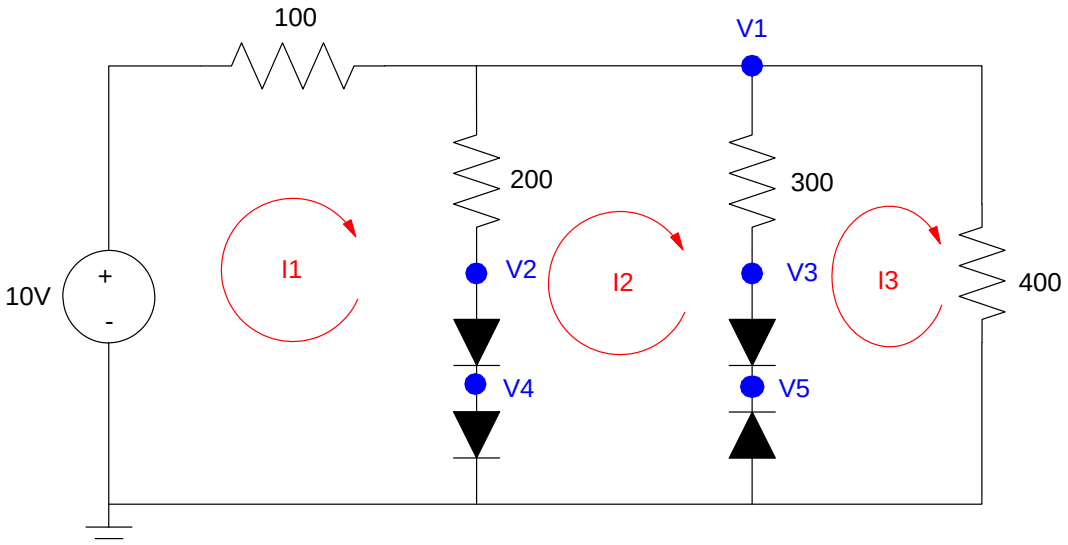
Assume ideal diodes with

Silicon Diode	Red LED	Green LED	Blue LED
Vf = 0.7V	Vf = 1.9V	Vf = 3.0V	Vf = 3.0V
		8000 mcd @ 20mA	

1) Assume ideal silicon diodes. Determine V1, V2, and V3



2) Assume ideal silicon diodes. Determine V1 .. V5



A Piranah RGB LED has the follwing characteristics:

- Red: Vf = 1.9V, 8000 mcd @ 20mA
- Green: Vf = 3.0V, 8000 mcd @ 20mA
- Blue: Vf = 3.0V, 8000 mcd @ 20mA

Color wheel: go to

http://www.rapidtables.com/web/color/color-wheel.htm

3) Design a circuit which output purple light

- Red = 2000mcd,
- Green = 0mcd,
- Blue = 8000 mcd

4) Design a circuit which outputs gold light

- Red = 8000mcd
- Green = 6300 mcd
- Blue = 2800 mcd

Lab: Build a clipper circuit

Requirements:

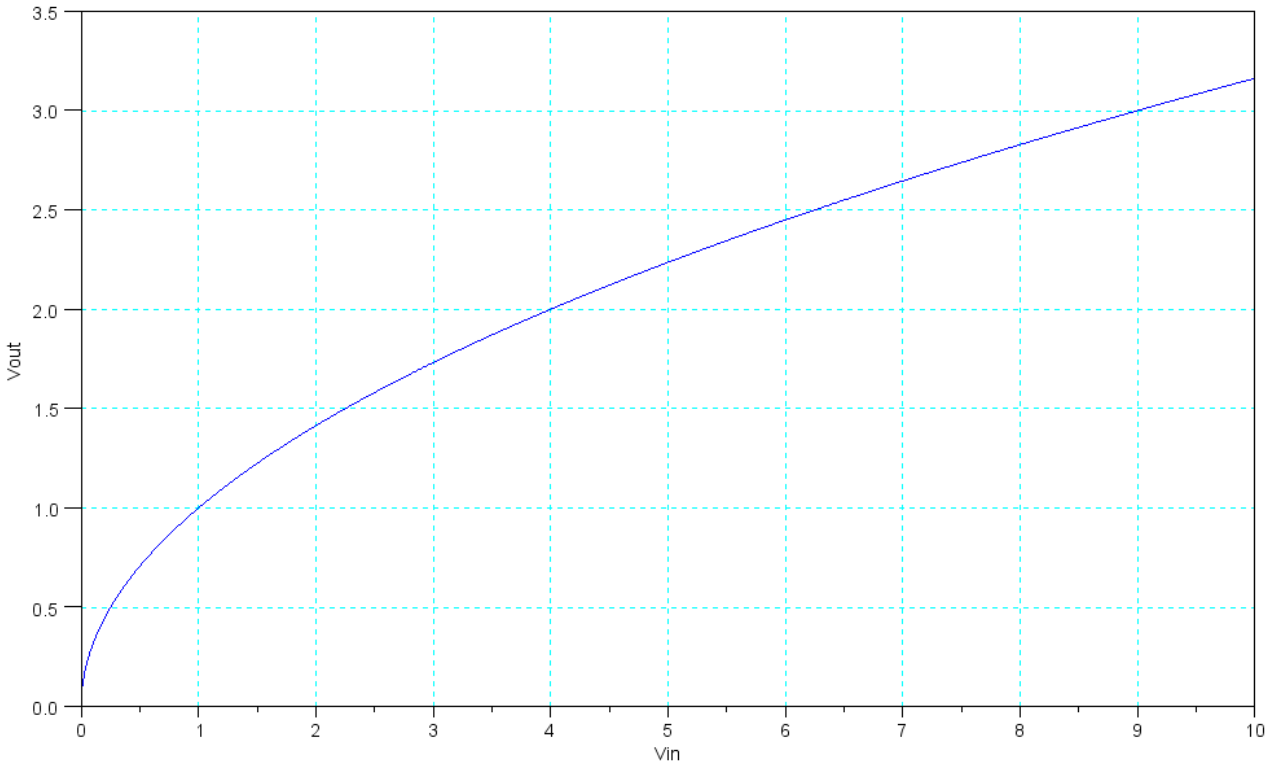
- Input: 0 to 10V DC, capable of 100mA
- Output: 0 to 10V DC, capable of driving a 1M resisance (10uA)
- Relationship: Approximate $Y = \sqrt{X} \quad \pm 1V$

5) Analysis: Design a circuit to meet the above requirements.

6) Test: Test your circuit in simulation (PartSim or similar program. Note you may need to check seceral points).

7) Validation: Build your circuit and test it in lab. Note: It makes the write-up easier if you measure the input / ouput voltages at the same points you simulated.

Note: *Plan ahead for problem #7. Designing a circuit where the diodes turn on at 0.7V, 1.4V, 2.1V is easu (cascade 1, 2, or 3 diodes). Other voltages are more difficult to impliment.)*


3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Vout
0
1
2
3
4
5
6
7
8
9
10
Vin