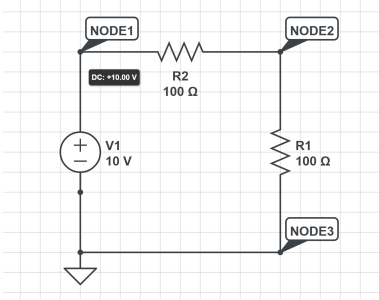
1. Resistors in series

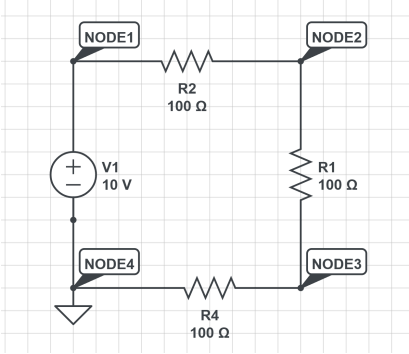
With a 10V voltage force, two resistors in series, and nodes on either side of the voltage source and in between resistors, here are the voltages and the current:

NODE1: 10.0V
NODE2: 5.0V
NODE3: 0.0V
Currents: 50mA



Now with a third resistor

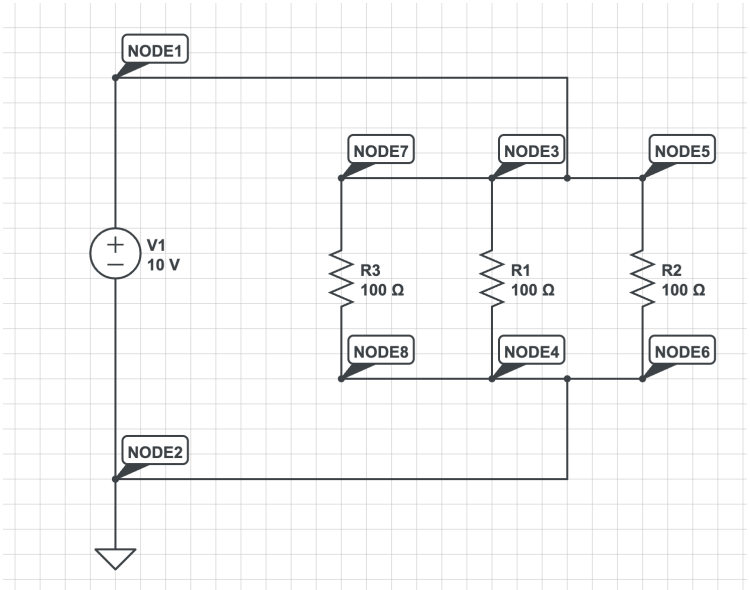
NODE1: 10.000V
NODE2: 6.667V
NODE3: 3.333V
NODE4: 0.000V
Current: 33.33



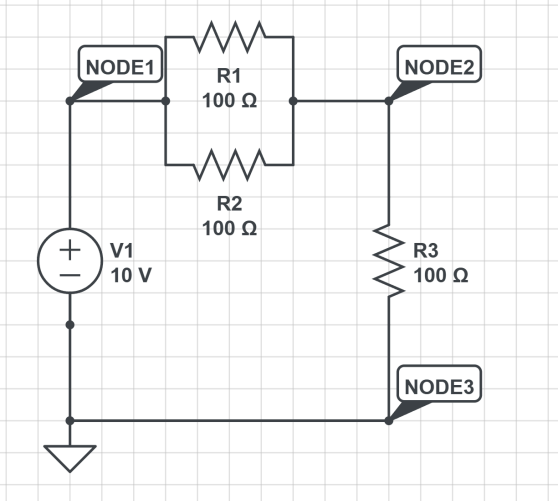
2. Resistors in parallel

NODE1: **10.0V**
NODE2: **0.0V**
NODE3: **10.0V**
NODE4: **0.0V**
NODE5: **10.0V**
NODE6: **0.0V**
NODE7: **10.0V**
NODE8: **0.0V**
Current across voltage source: **200mA**
Current across R1: **100mA**
Current across R2: **100mA**
Current across R2: **100mA**

No change in the voltage of the original nodes and the current across all resistors

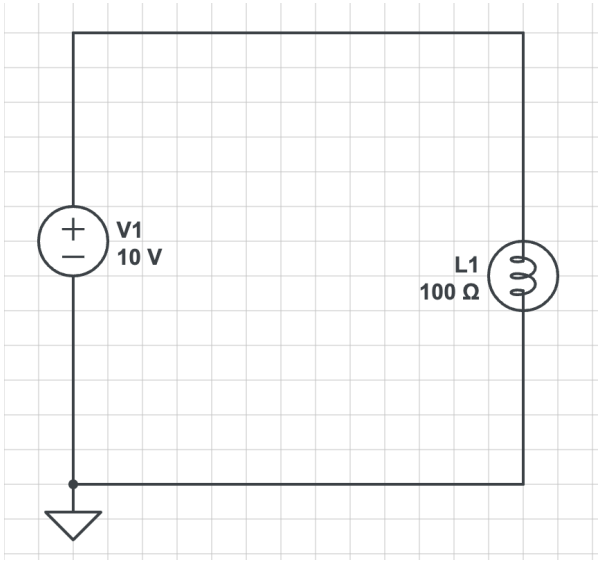


3. Resistors in series and parallel



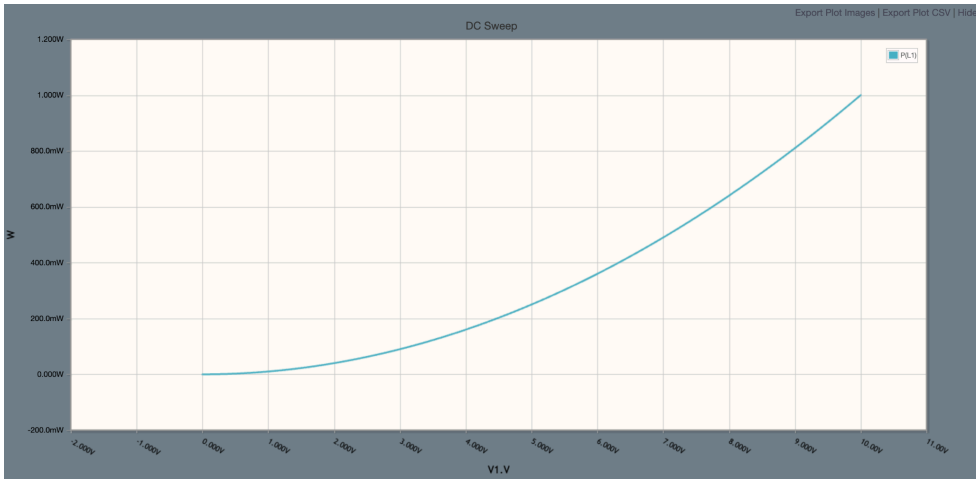
NODE1: 10V
NODE2: 6.667V
NODE3: 0.00V
Current at NODE1: -66.67mA
Current right before R1: 33.33mA
Current right before R2: 33.33mA
Current right after R1: -33.33mA
Current right after R2: -33.33mA
Current right before R3: 66.67mA
Current right after R3: -66.67mA
So in series the current stays the same, but when there are resistors in parallel it splits the current up

4. Powering light bulbs

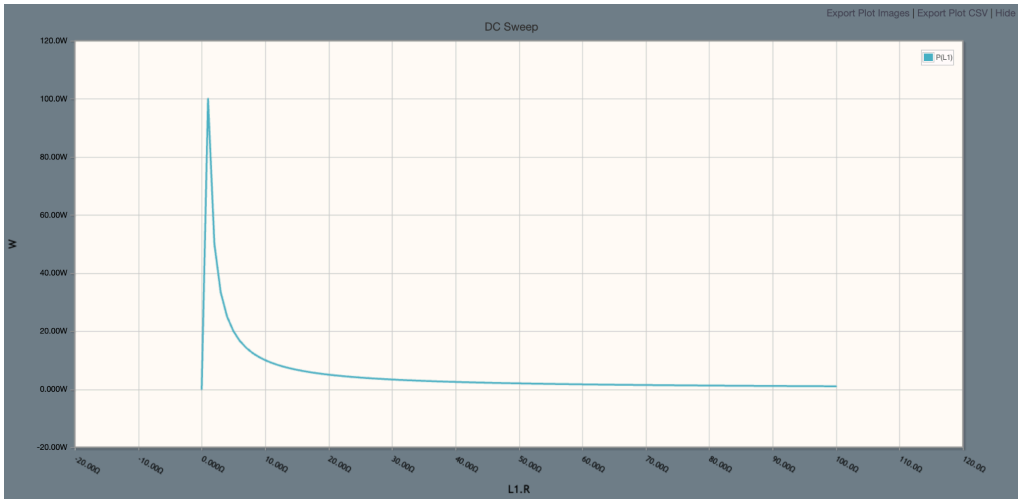


Power of L1: **1W**

DC solver's value of L1: **1W**



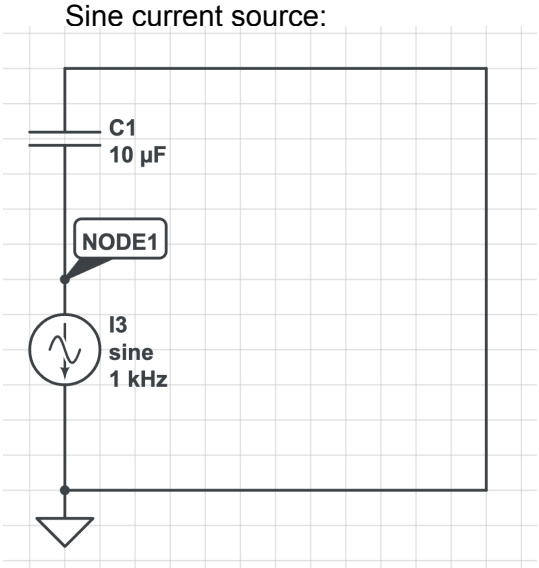
The lightbulb power and the voltage of the battery creates a parabolic function.

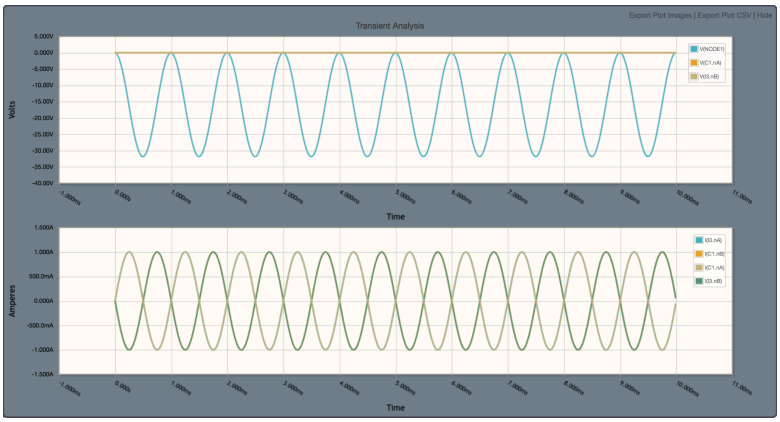


The lightbulb power and the resistance has an inversely proportional relationship.

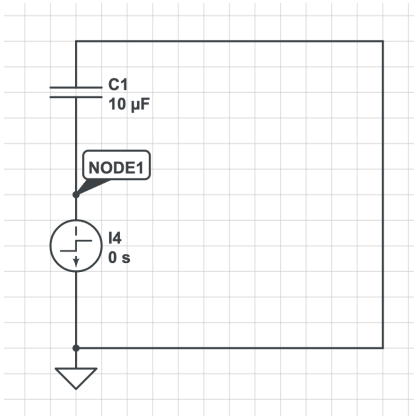
5. Capacitor Circuit

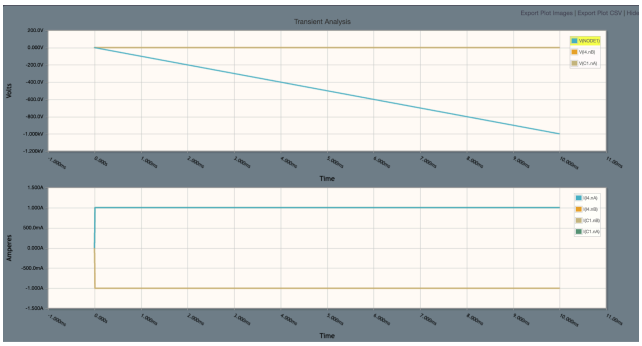
Sine current source:



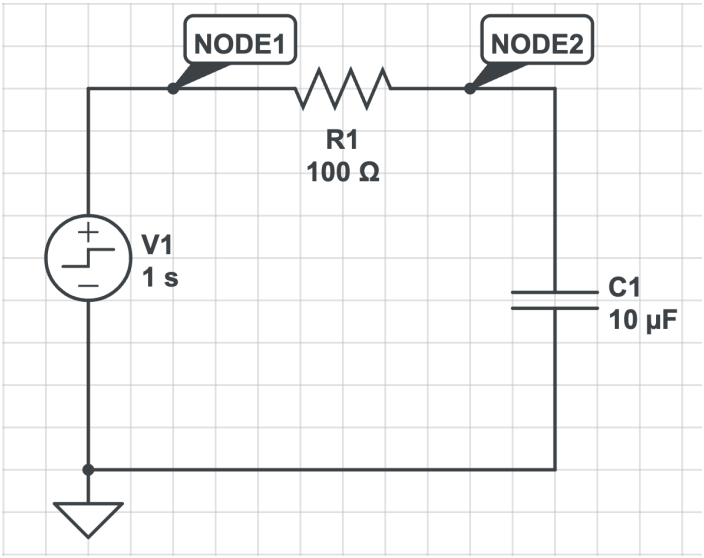


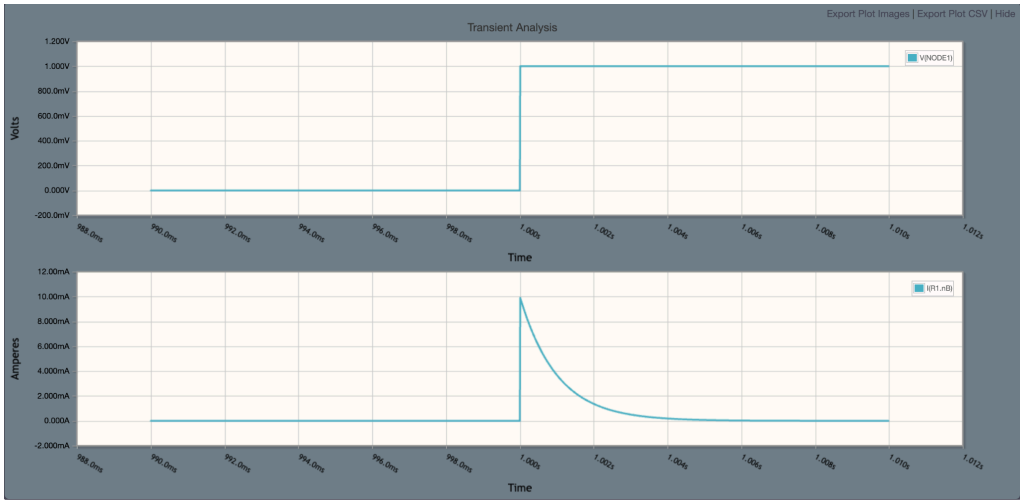
Step current source:





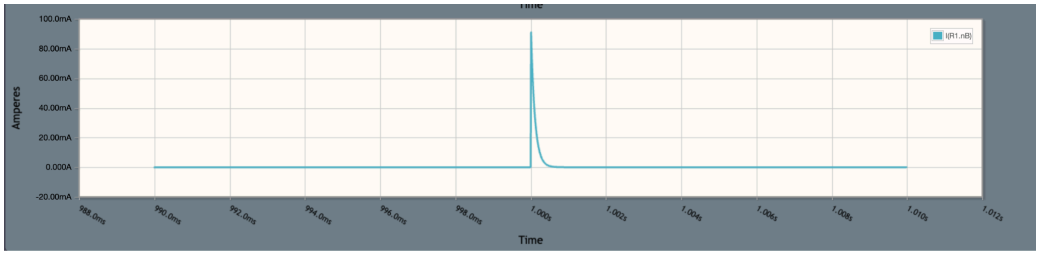
6. RC Circuit



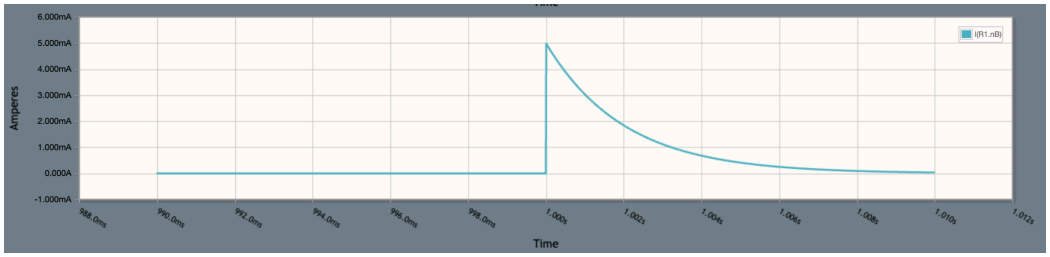


Over time, the voltage instantaneously changes to 1V while the current decreases exponentially.

R = 10 ohms

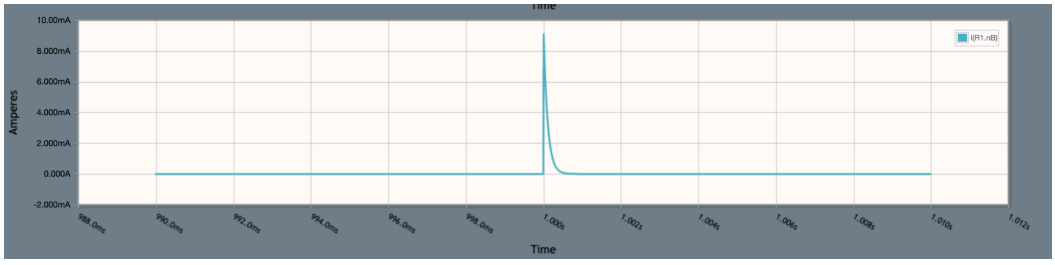


R = 500 ohms

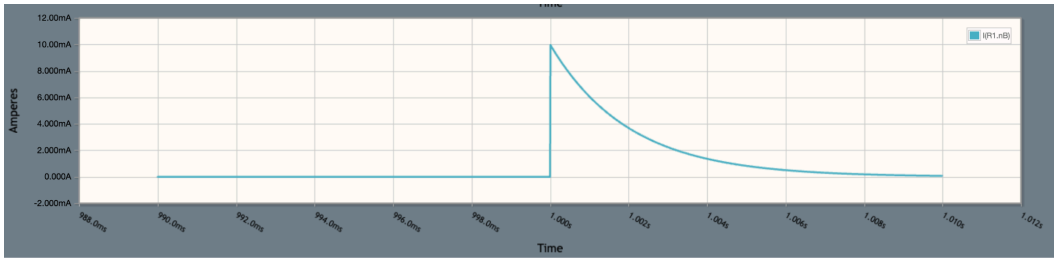


As resistance increases, the decrease in current slows down

C = 1uF



C = 20uF



As capacitance increases, the decrease in current slows down

7. RC Filter