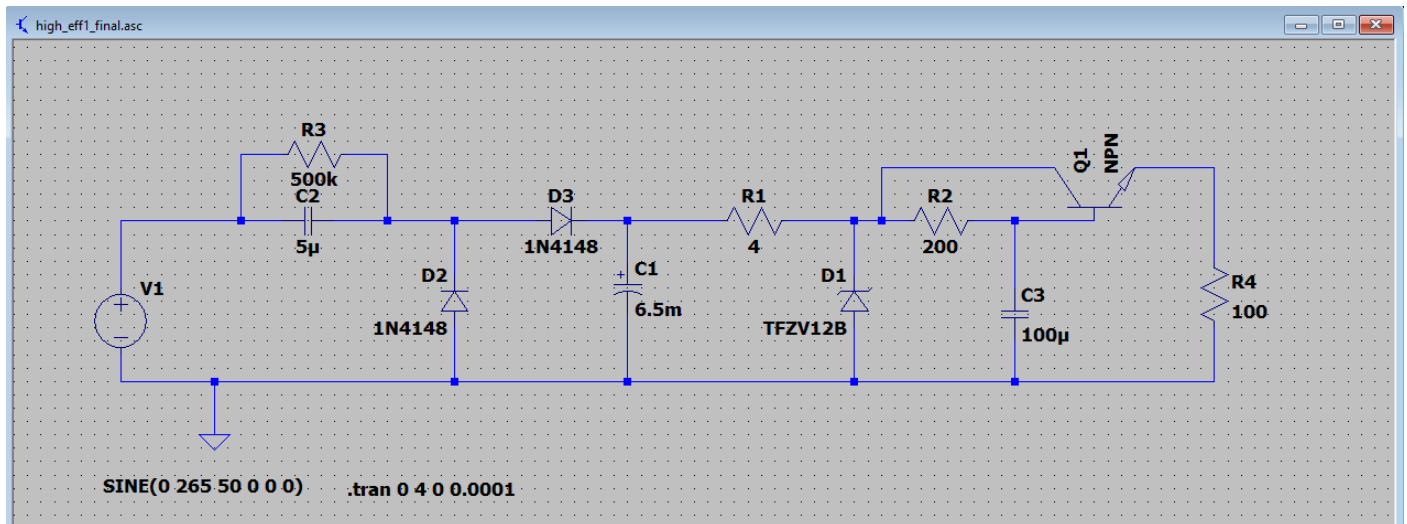


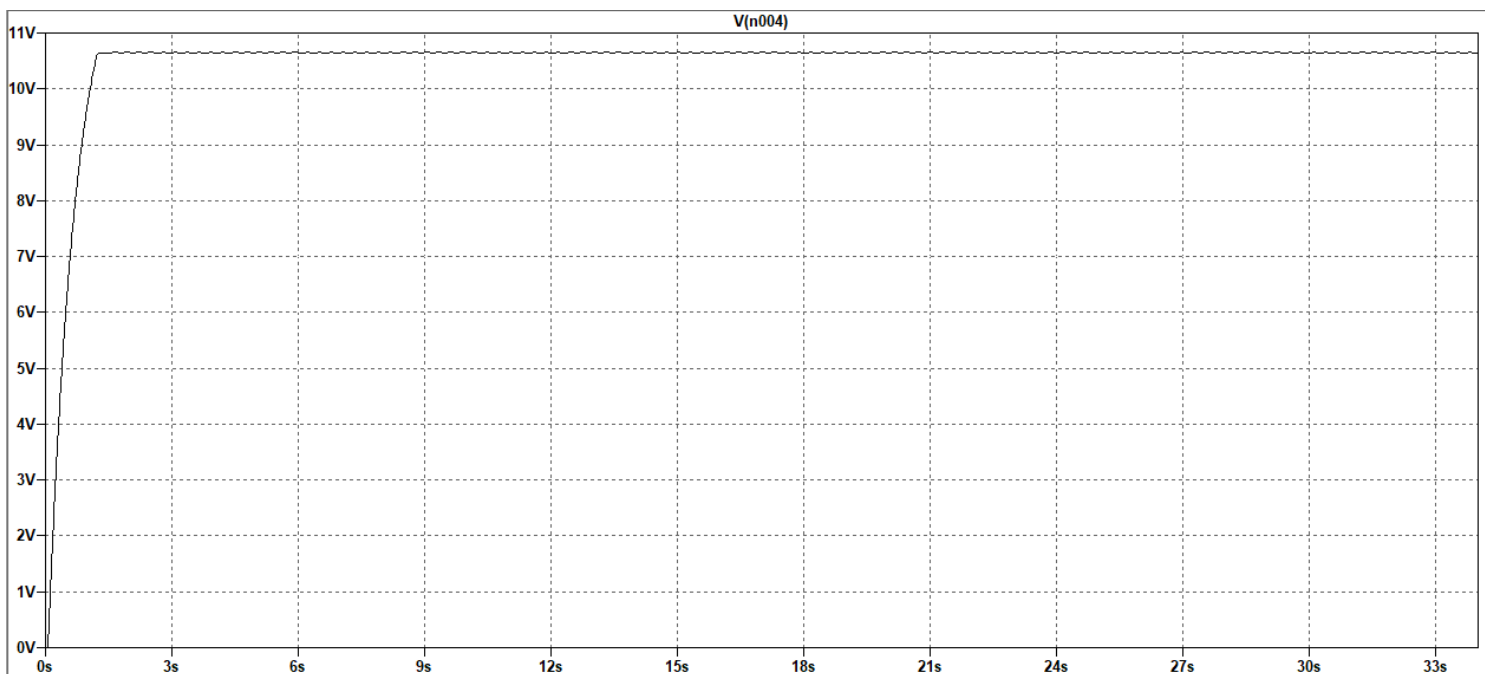
Team B Capacitor PSU design

1. Circuit Diagram:



We decided to go for the capacitor power supply unit, since it is relatively easy to build, design and it is cheap. The PSU consist of a capacitor resistor pump, a rectifier to convert AC to DC. We added a smoothing capacitor and a transistor to smooth out the waveform and reduce ripples.

2. Transient Response simulation for 30+ seconds



Transient response reached at 1.25 seconds.

Steady-state DC output of 10.649V

Steady-state output power of 1.134W

3. Load definition

The current draw from the il matto is 5mA when on. We predict the interface circuitry having 8 mosfets and an opamp. The DC output is 10.6V from the PSU. The il matto, display and interface circuitry is estimated to have a current draw of 0.1A.

The effective load resistance is $10.6V / 0.1A$ meaning the load we have used is 100 Ohms. This is represented by R4.

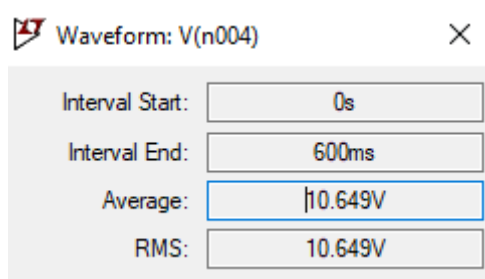


Figure 1, transient output from R4 after 1.4 seconds

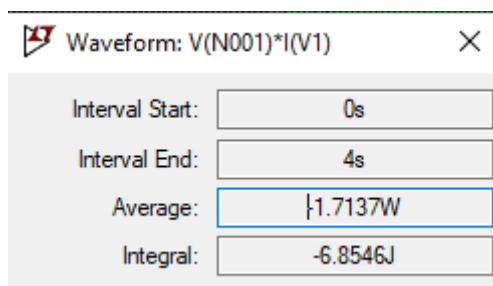


Figure 2, transient input power from AC main

R4(100 Ohms) load Transient output:

1. Power: 1.134W
2. Current: 106.46mA
3. Voltage: 10.649V

Input from main:

1. AC voltage: 265V @50Hz
2. Power: 1.714W

Power Efficiency: $1.134/1.714 = 66\%$