

Title of the experiment:

Design of Switch Mode Power Supply

Theory:

A switch-mode power supply (switching-mode power supply or SMPS) is an electronic power supply that uses a switching regulator in order to control the conversion of electrical power in an efficient manner. The chief advantage of this switched-mode power supply is its higher efficiency because of lower heat dissipation.

In many applications, we need to convert the voltage from one level to another level. Linear regulators offer a simple low cost solution, but they generate more heat which makes the device inefficient and lossy. In addition to that it requires bulky heat sinking to dissipate the heat. An optimum solution is a dc/dc converter (switched mode power supply).

Schematic Diagram:

The circuit schematic of the switch mode power supply to convert 12V DC supply to 9V DC in **eSim** is as shown below:

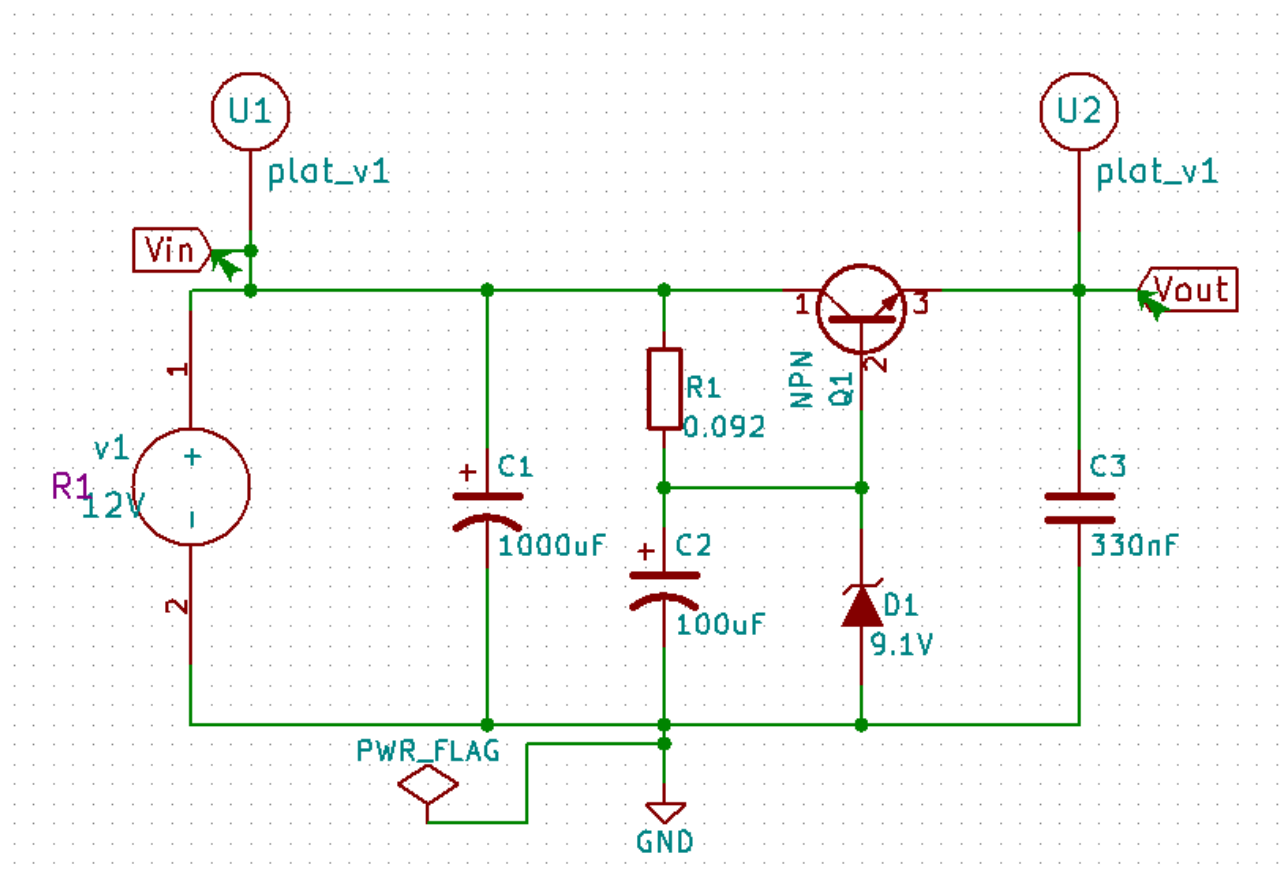


Figure.1: 12V to 9V DC-DC Converter

Simulation Results:

1. Ngspice plots

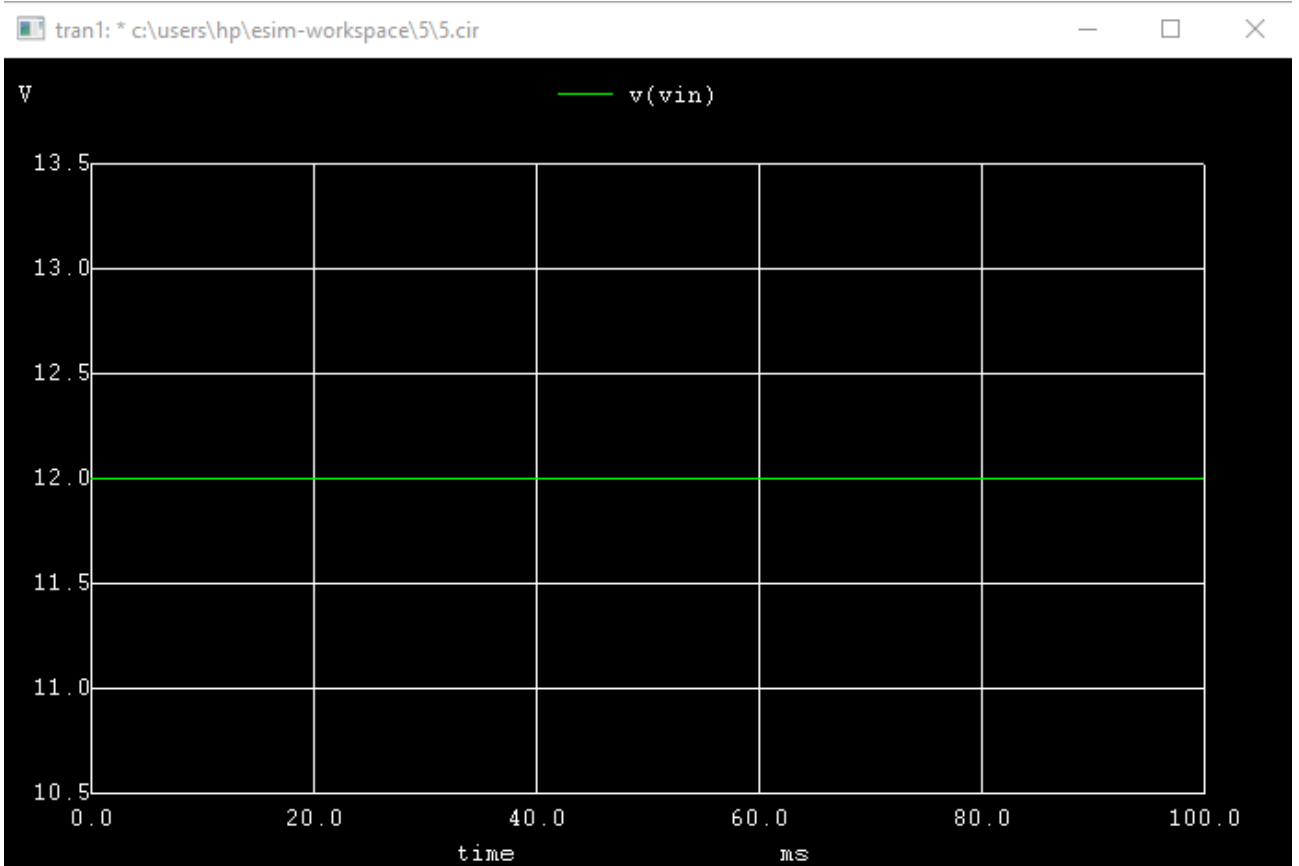


Figure 2: Ngspice Input Plot

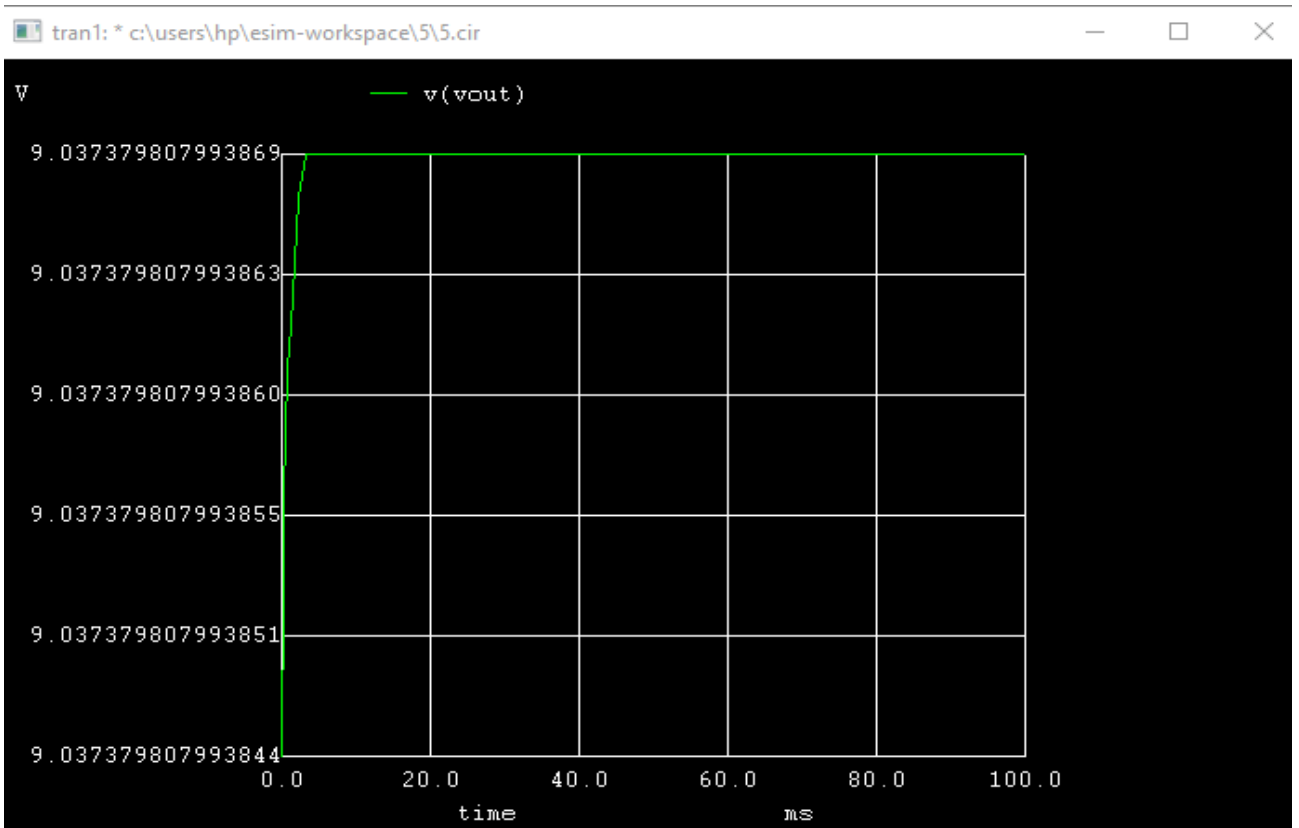


Figure 3: Ngspice Output Plot

2. Python Plots:

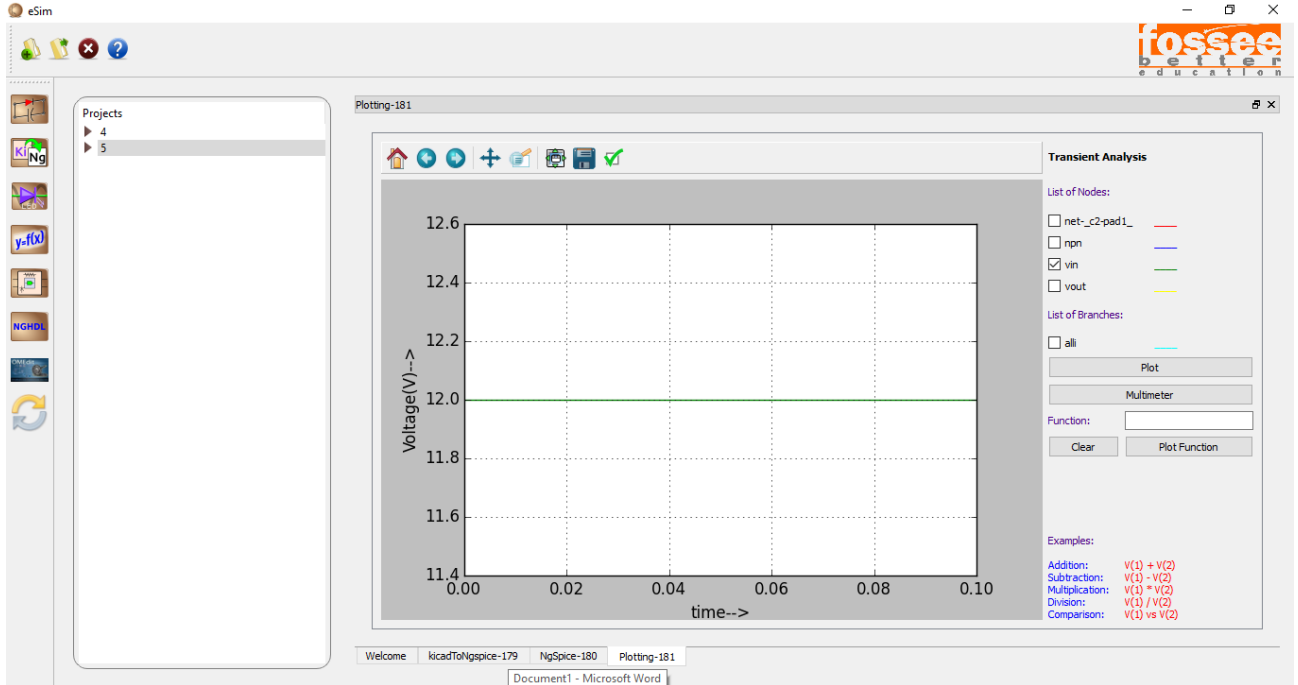


Figure 4: Python Plot Input

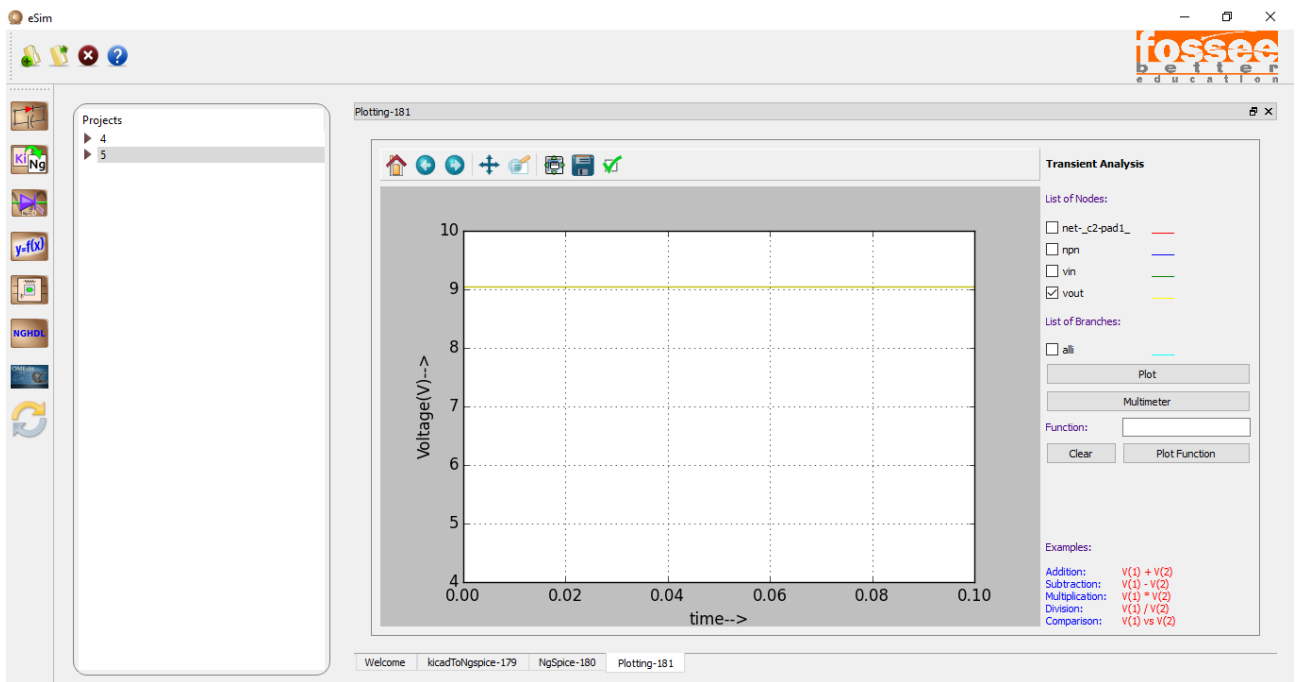


Figure 5: Python Plot Output

Conclusion:

Thus, I have studied the switch mode power supply that converts 12V DC to 9V DC using **eSim** and got the appropriate waveforms.

Reference:

<http://powersupply33.com/simple-12-volt-to-9-volt-dc-dc-converter.html>