Dr. Mahalingam college of Engineering and Technology

Department of Electronics and Communication Engineering

TITLE:

230V AC to 5V DC CONVERTER (without transformer)

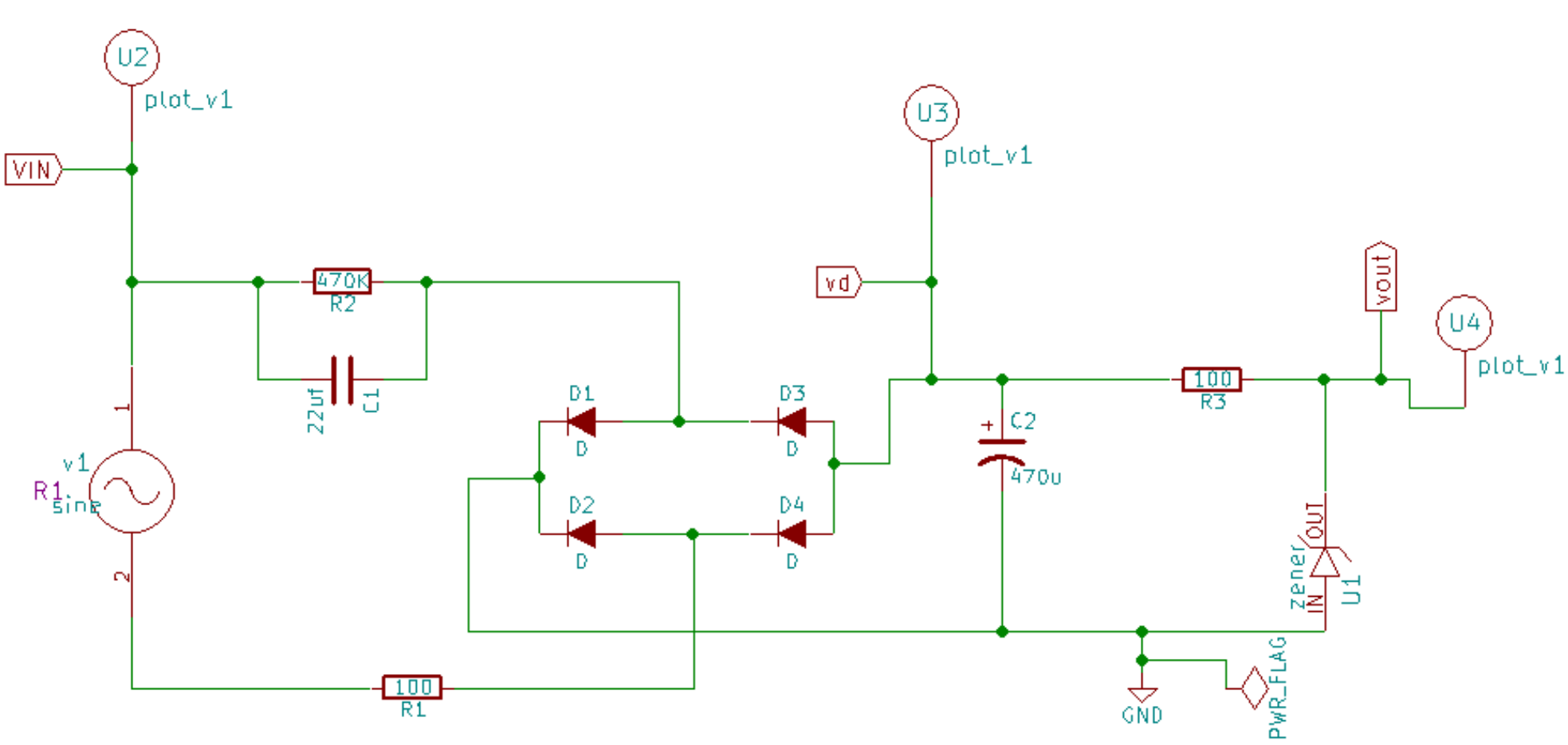
PROJECT MEMBERS:

1) R.K.Karthik Sridhar
2) L.Vignesh
3) S.Dayalan

THEORY:

Generating Low voltage DC, from the 230V (60Hz) or 110V (50Hz) as AC mains, is very useful and necessary in the field of electronics. Low voltage DC like **1V, 3V, 4V, 5V** is used in electronics circuits, LED bulbs, toys and many household electronics items. The straight forward approach is to use step-down transformer to low down the AC, but the disadvantages of using transformer are that they are expensive in cost, heavy in weight and big in size. In this circuit we have designed an converter without using a Transformer.The main component of a **Transformerless power supply circuit** is **Voltage dropping capacitor** which are specially designed for AC mains.Further Bridge rectifier (combination of 4 diodes) has been used to remove the negative half component of AC. This process is called the **Rectification**. And finally a Zener diode of 5.26v/1w is used as voltage regulator.

CIRCUIT DIAGRAM:



SIMULATION:

1)PYTHON PLOT:

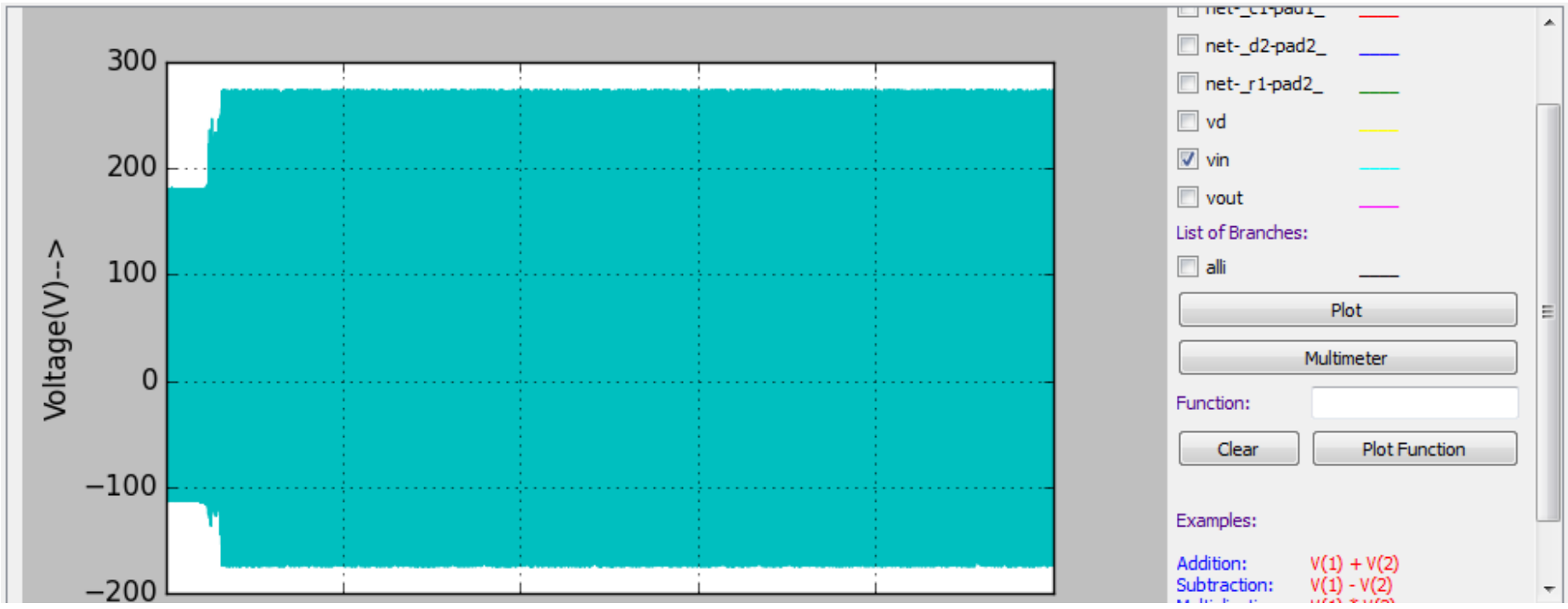


Fig1: Python plot-input voltage

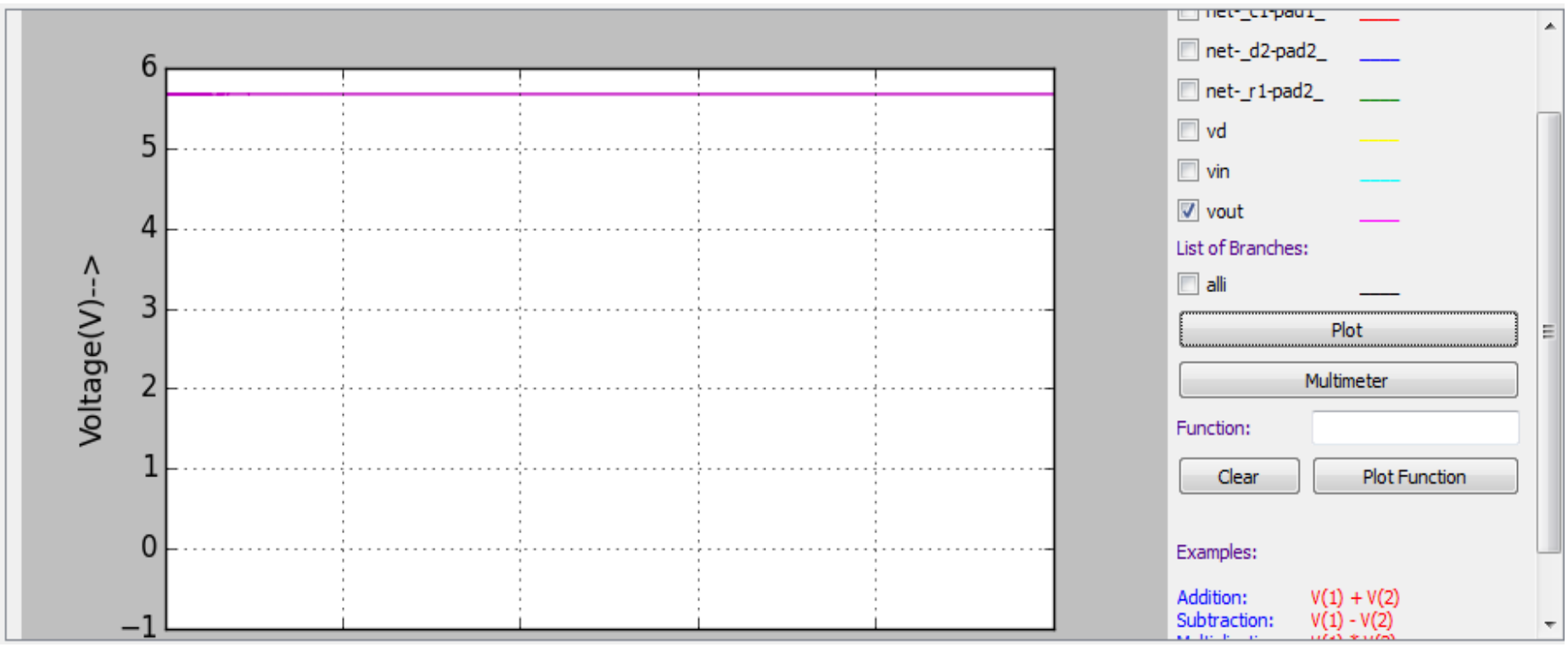


Fig2:Python plot-output voltage

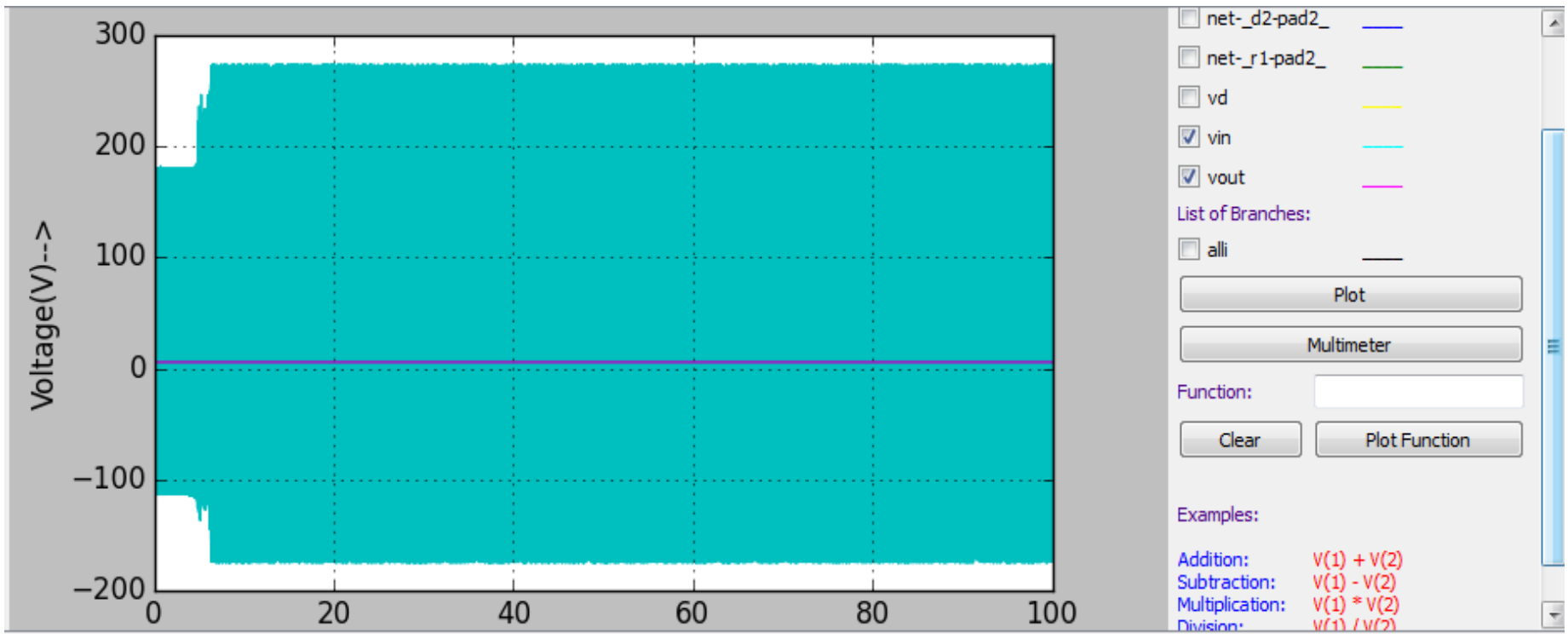


Fig3: Python plot- Input and output voltage

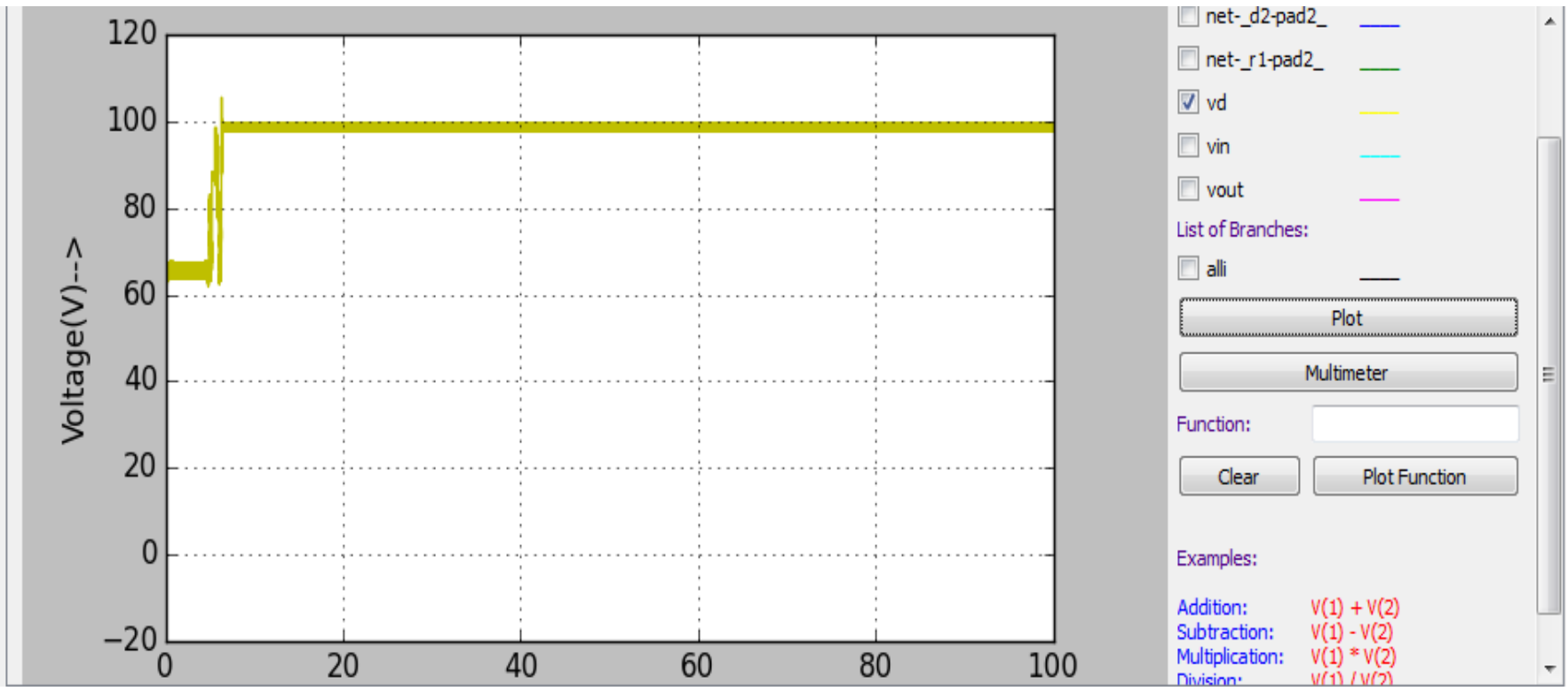


Fig4: Python plot- Voltage across diode

2)NG-SPICE PLOT:

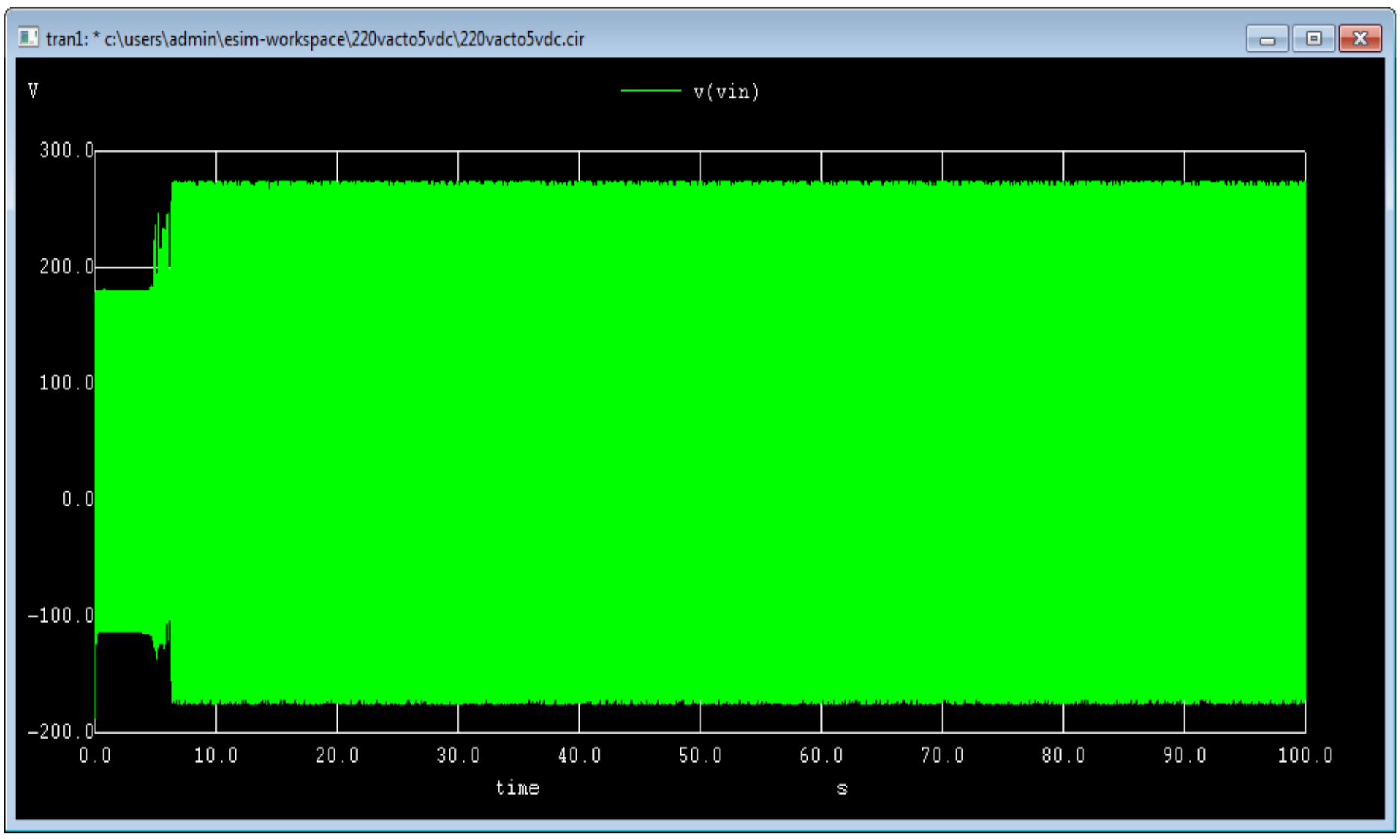


Fig5: NG-SPICE plot input voltage

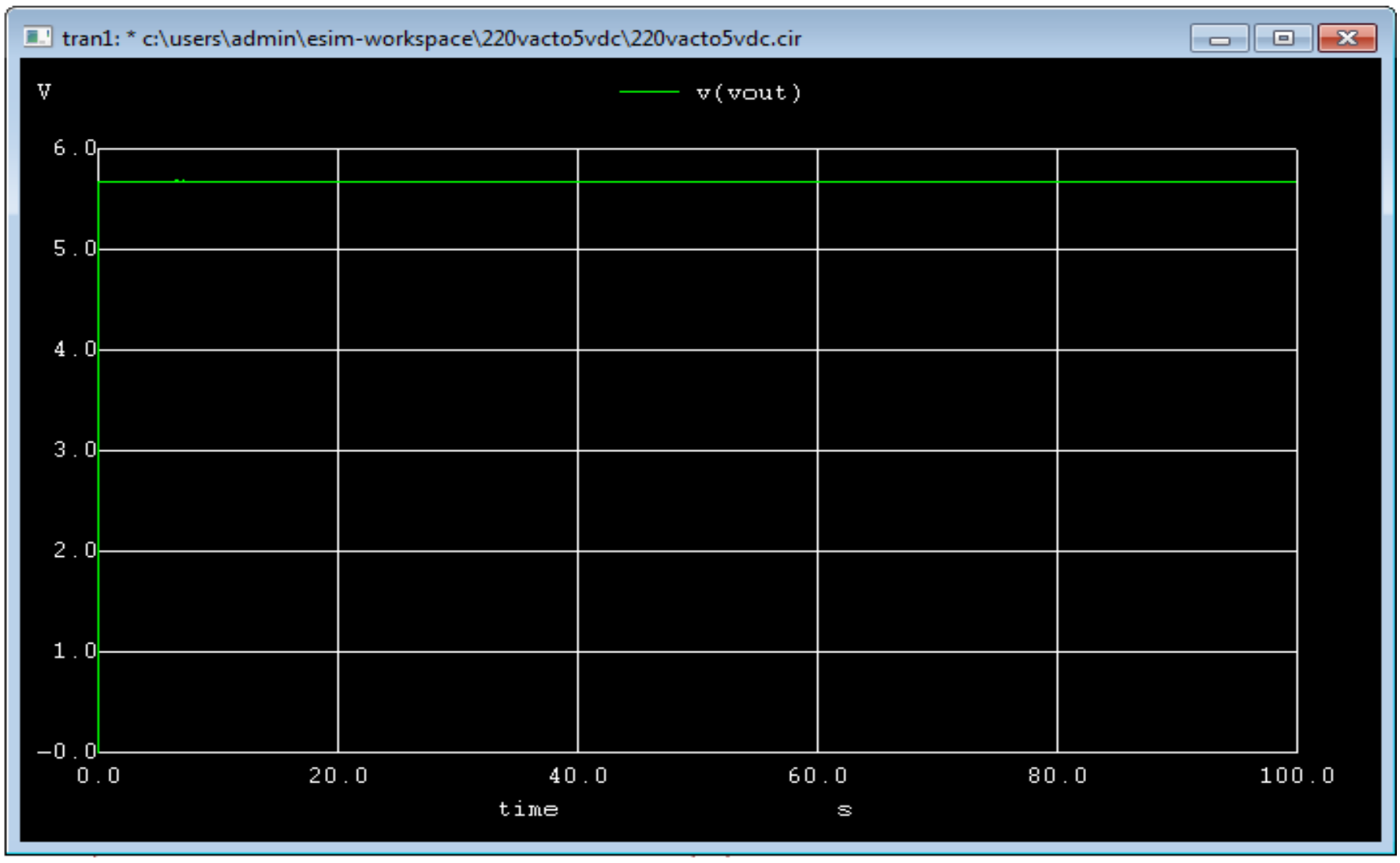


Fig6: NG-SPICE plot output voltage

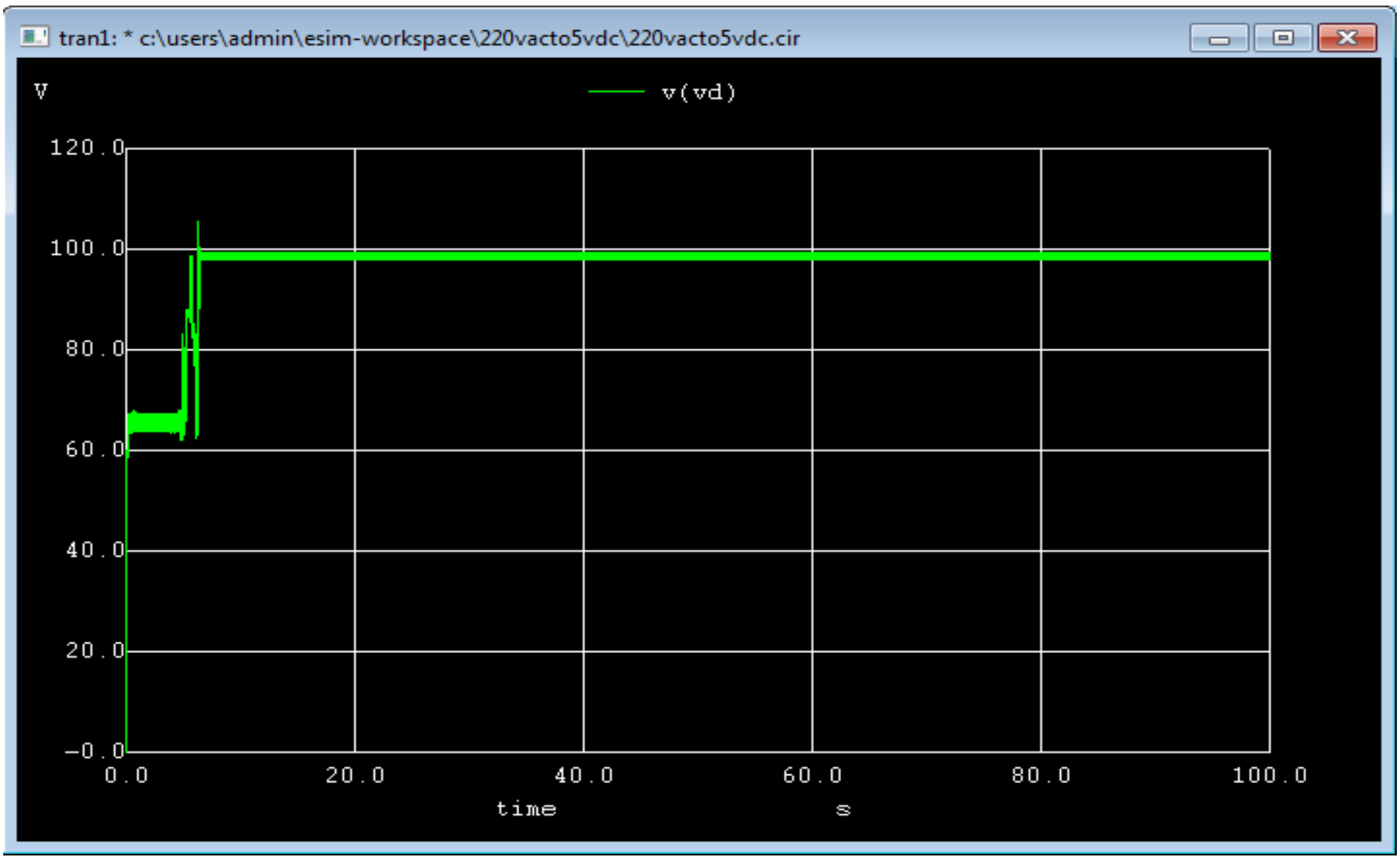


Fig7: NG-SPICE plot output voltage

CONCLUSION:

Thus we have designed the 230VAC to 5V DC converter without Transformer using e-sim and plotted the appropriate waveforms.

REFERENCE:

https://www.eleccircuit.com/transformerless-ac-to-dc-power-supply-circuits/