SINGLE PHASE FULL WAVE INVERTER

Circuit Simulation done by

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Theory

DC to AC converters is known as inverters. The function of an inverter is to change a DC input voltage to a symmetrical ac output voltage of desired magnitude and frequency. The output voltage could be variable or fixed frequency. A variable output voltage can be obtained by varying the input DC voltage and maintaining the gain of the inverter constant. On the other hand, if the DC input voltage is fixed and it is not controllable, a variable voltage can be obtained by varying the gain of the inverter, which is normally accomplished by pulse-width-modulation (PWM) control within the inverter.

A single phase bridge voltage source inverter is shown in Figure 1. It consists of four choppers T_4 and the four inverse parallel diodes D_1, D_2, D_3, D_4. When the switches Q_1 and Q_2 are turned on simultaneously for a duration $0 \leq t \leq \frac{T_o}{2}$, the input voltage V_s appears across the load and the current flows from point a to b. If the switches Q_3 and Q_4 are turned on for a duration $\frac{T_o}{2} \leq t \leq T_o$, the voltage across the load is reversed and the current through the load flows from point b to a. The voltage and current waveforms across the resistive load are shown in Figure 2.

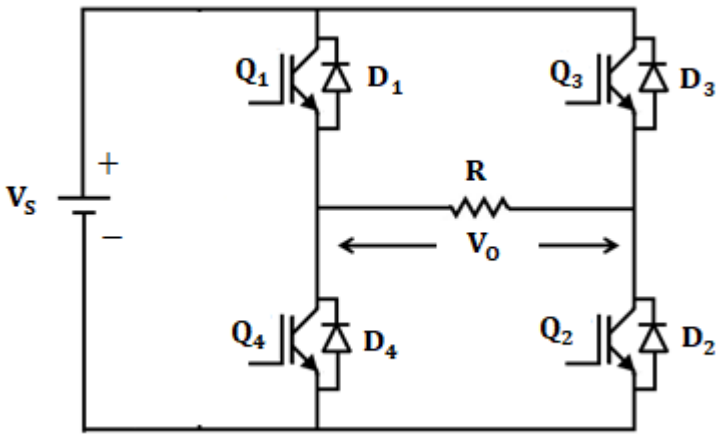

Figure 1 Circuit diagram of Single phase inverter

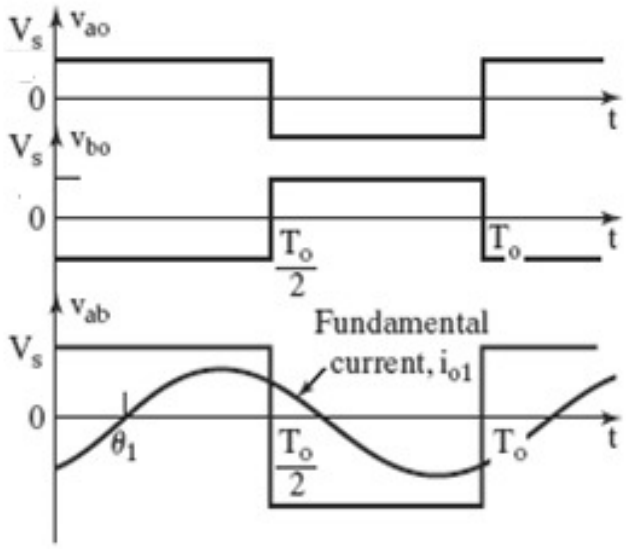

Figure 2 Output waveform

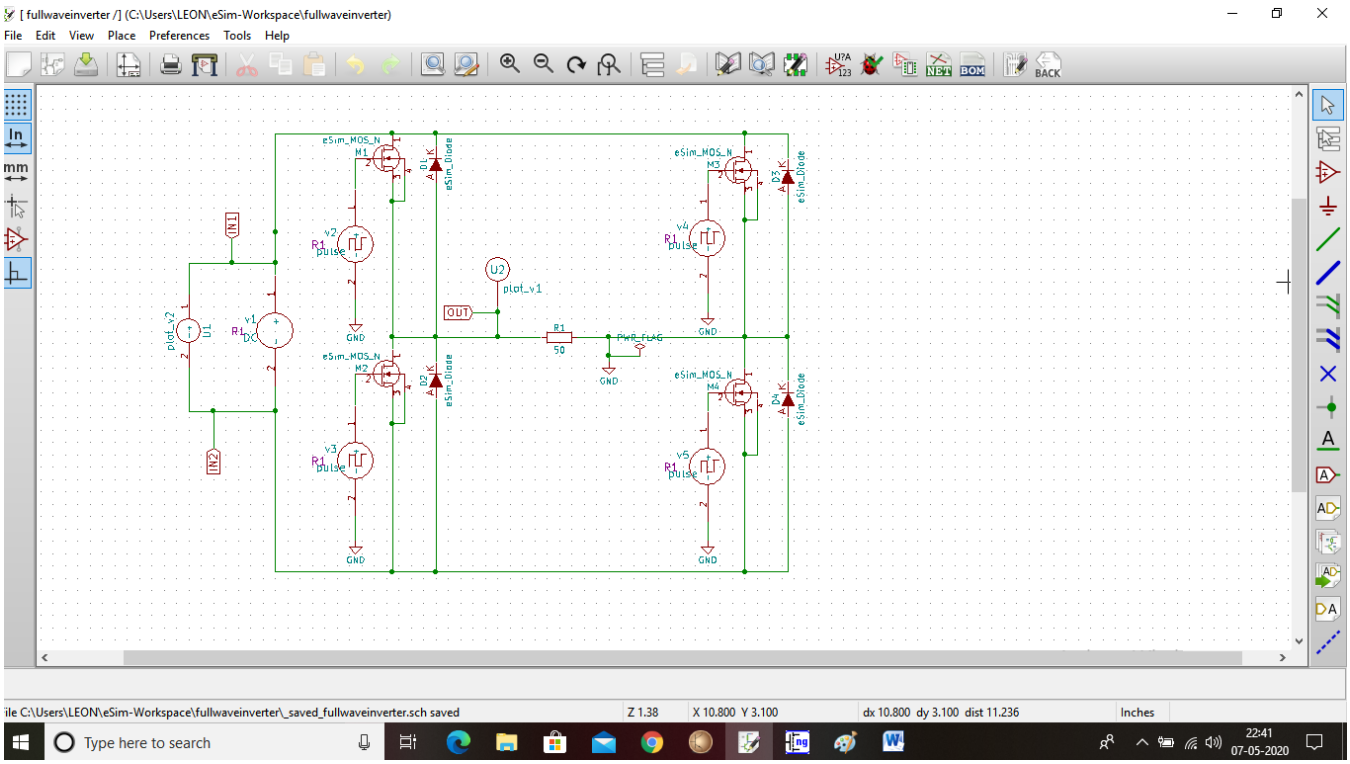

Figure 3: Schematic view of Buck converter in eSim

Simulation results

1) Ngspice Plots

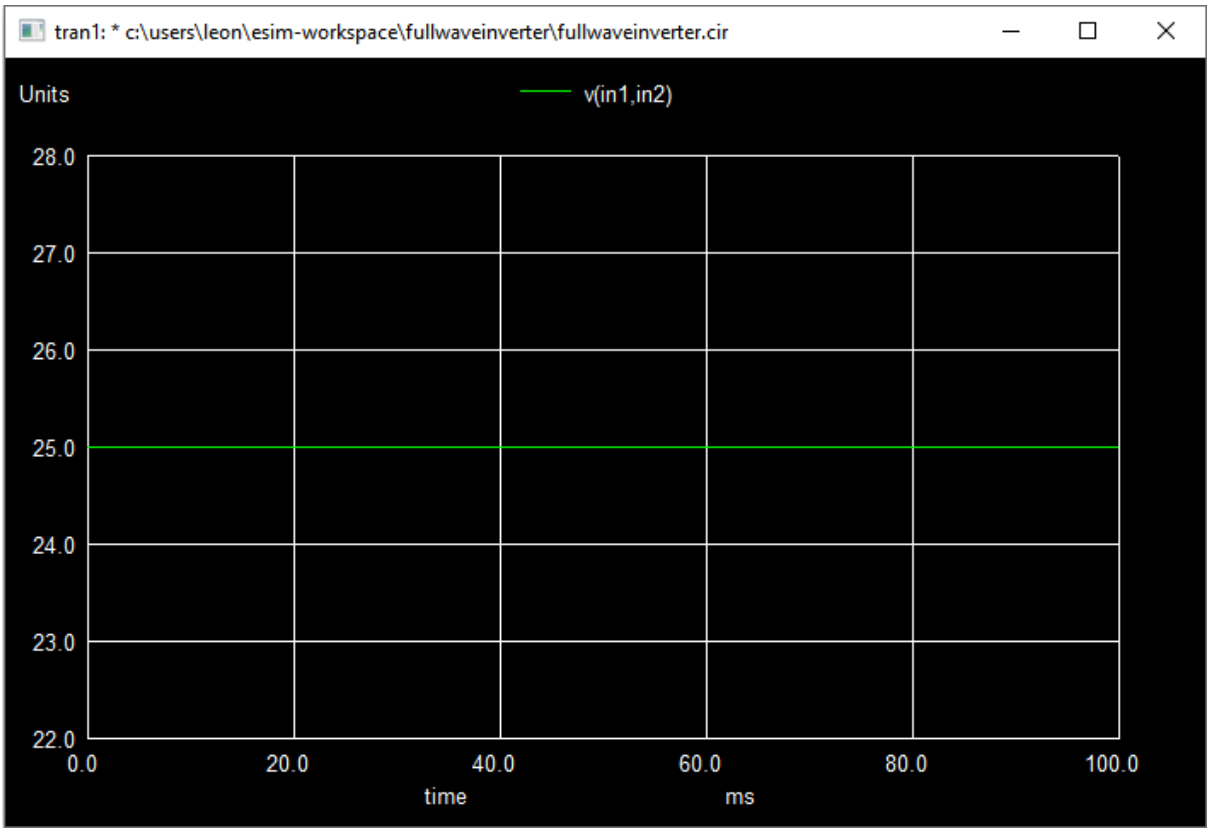

Figure 4: Input voltage wave form

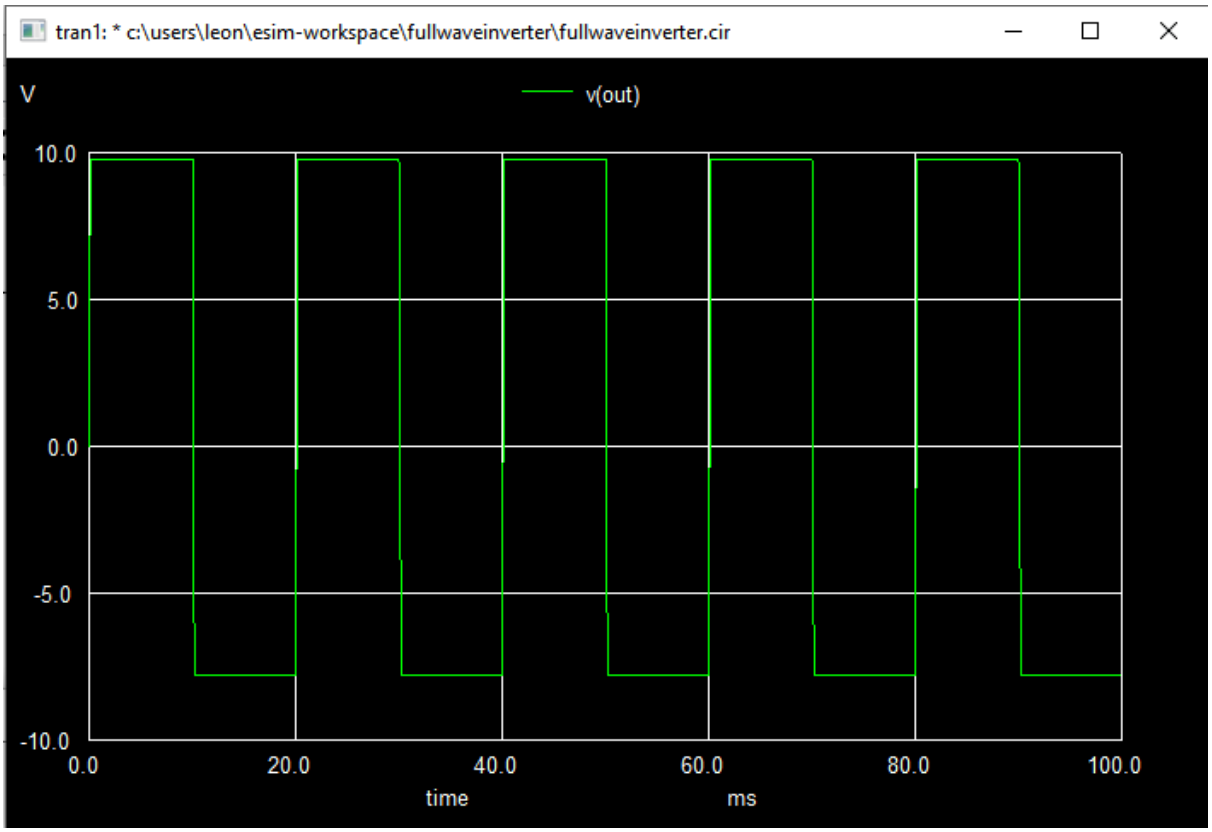

Figure 5: Output voltage wave form

2. Python Plots:

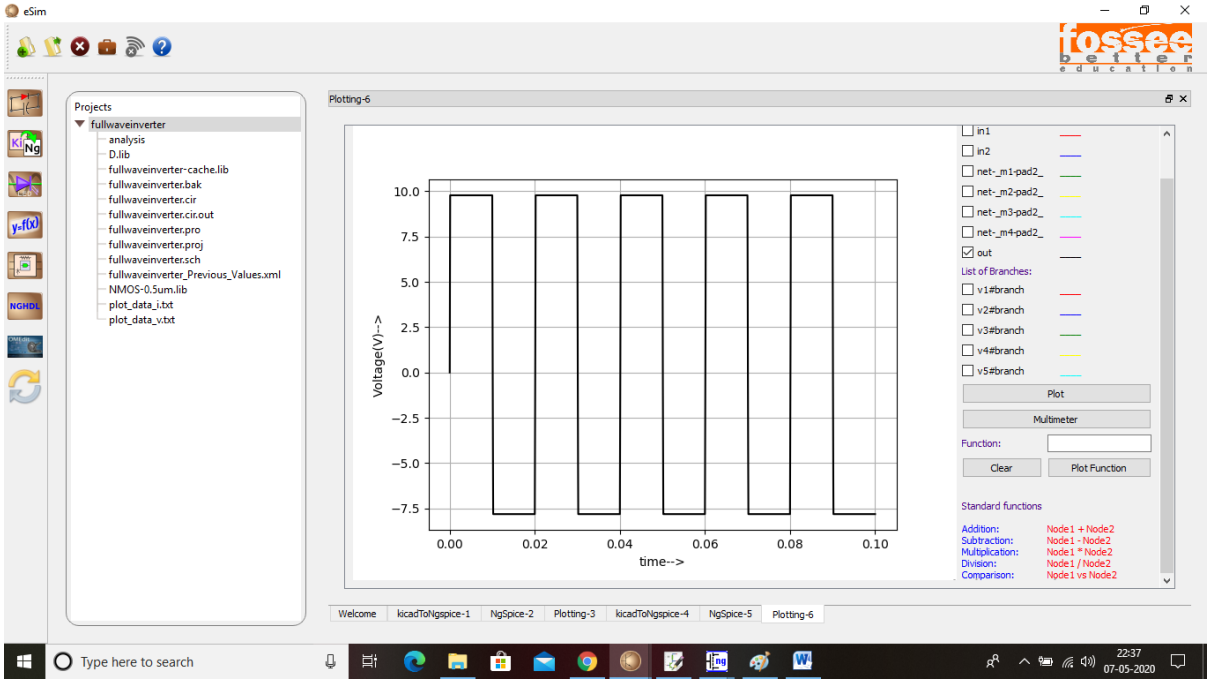

Figure 6: Python plot for input and output voltage waveform

Reference

Power Electronic circuits, Devices and Applications, Muhammed H. Rashid, Third Edition, Pearson Publishers.