Name - Praveen Devarakonda
Roll No - 224102317

Single Phase Unipolar PWM Inverter

1 Objective:

To simulate the Single Phase Full Bridge Inverter with Unipolar PWM technique in MATLAB/SIMULINK.

1.1 Design specifications:

- Input Voltage (V_{in}): 350 V
- Peak value of triangular voltage : 10 V
- Frequency of triangular signal : 1KHz
- Load Resistor (R): 50 Ω
- Load Inductor (L): 50 mH;
- Control signal (V_{cont}): 6sin(2*50πt)

2 Unipolar PWM Technique:

- One leg is controlled with V_{cont} and another with -V_{cont}.
- When V_{cont} . $V_{tri} \longrightarrow$ T1 is ON, and When $V_{cont} < V_{tri} \longrightarrow$ T4 is ON.
- When -V_{cont} . -$V_{tri} \longrightarrow$ T2 is ON, and When -$V_{cont} <$ -$V_{tri} \longrightarrow$ T3 is ON.
- Output voltage (V_0) = $\mathrm{m}_a(V_{in})sin(nw_0t)$
- Total harmonic distortion (THD) : $\sqrt{\frac{V_{rms}^2 - V_1^2}{V_1^2}} = 6.27\%$

3 Simulation Diagram :

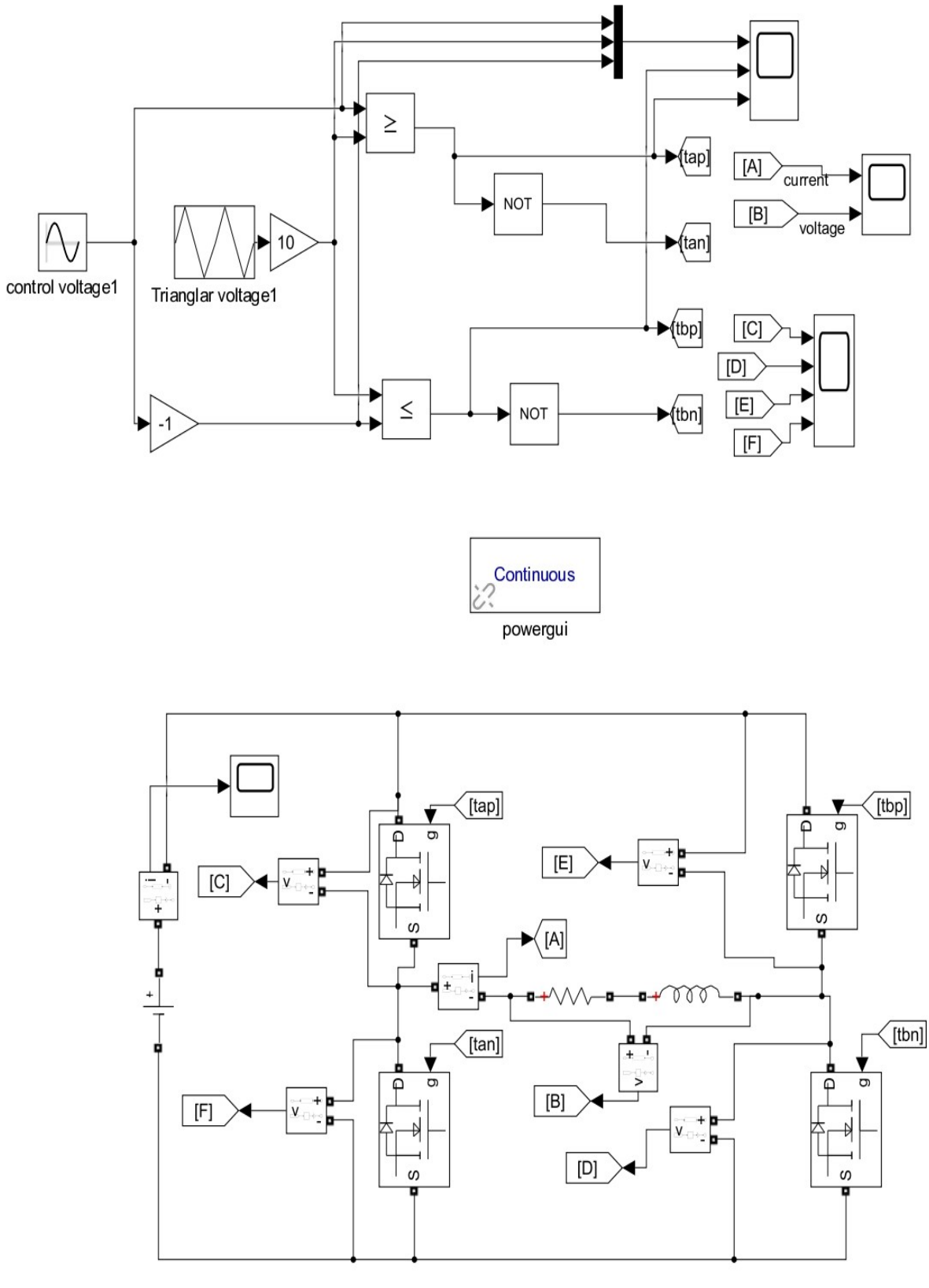

Fig. 1: Simulink Model

4 Waveforms

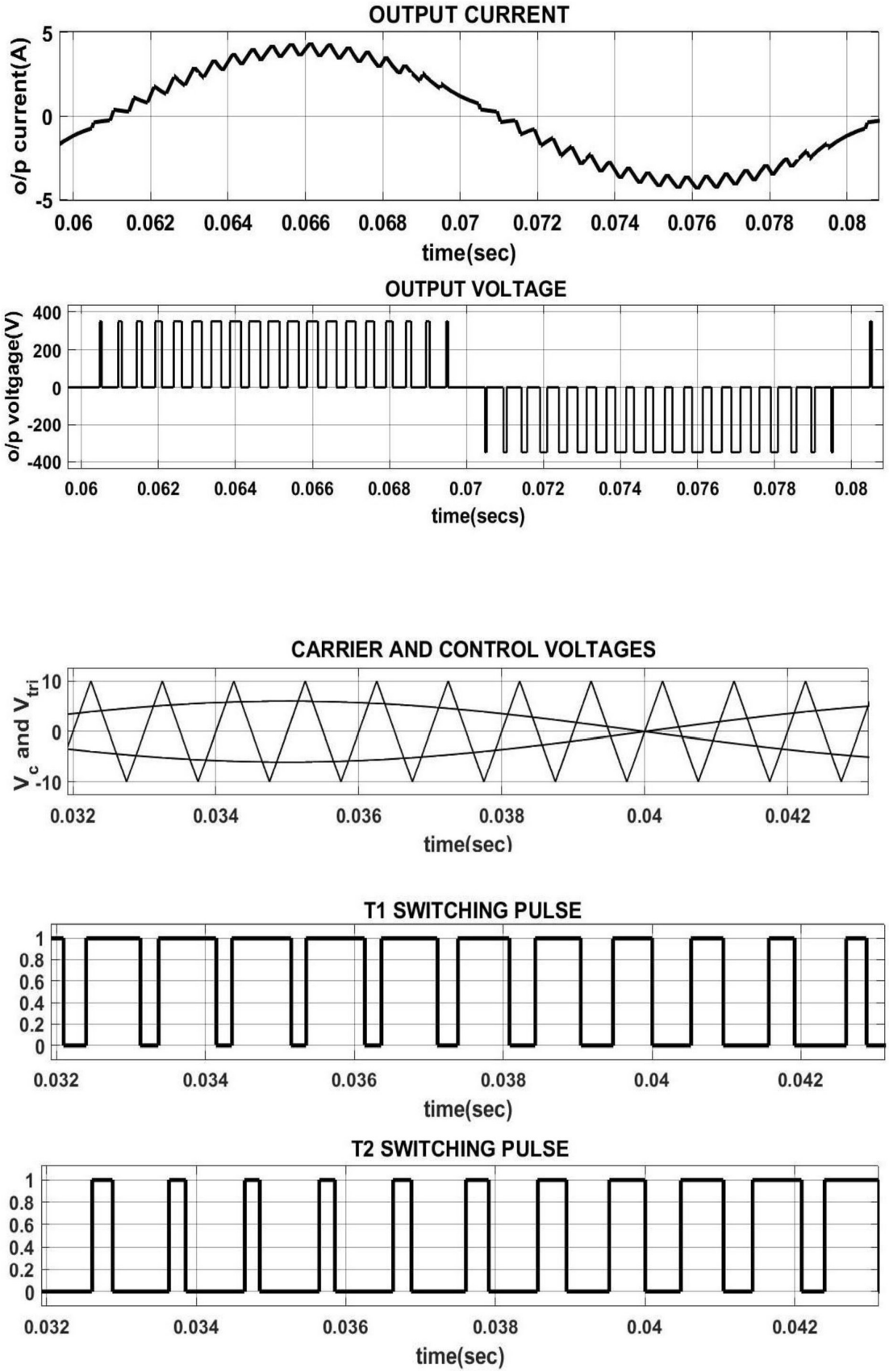

Fig. 2: Output voltage and Output current waveforms

4.1 Harmonics spectrum

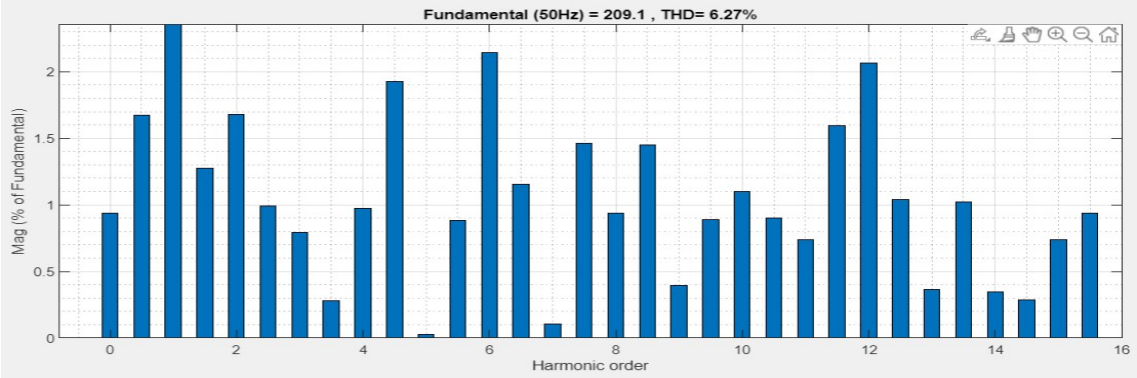

Fig. 3: Harmonics spectrum of Load voltage