SRINIGHA A

3rd YEAR B.E

ECE DEPT

BANNARI AMMAN INSTITUTE OF TECHNOLOGY

Title of the experiment:

Analysis of Reversible XOR Full Adder using eSim.

Theory:

Feynman gate is a 2 ∗ 2 one through (One of the input value is retained at the output) reversible gate. If the input to Feynman gate is A&B then the corresponding output of the gate is defined by P = A, Q = A⊕B. The Quantum cost of a Feynman gate is l and the Transistor cost of the gate is 8. Feynman Gate (FG) can be used as a copying gate. As we know that, in a reversible logic fan-out is not permitted the Feynman gate is useful in situation where fan-out are required because it is capable of providing duplication of the required outputs. Here in reversible XOR circuit we use four PMOS and four NMOS. Four inverters are used. Totally there are two inputs and two output. One output is P = A. Another output is Q = A⊕B.

Schematic Diagram:

The circuit schematic of the Reversible XOR Full Adder in eSim is as shown below:

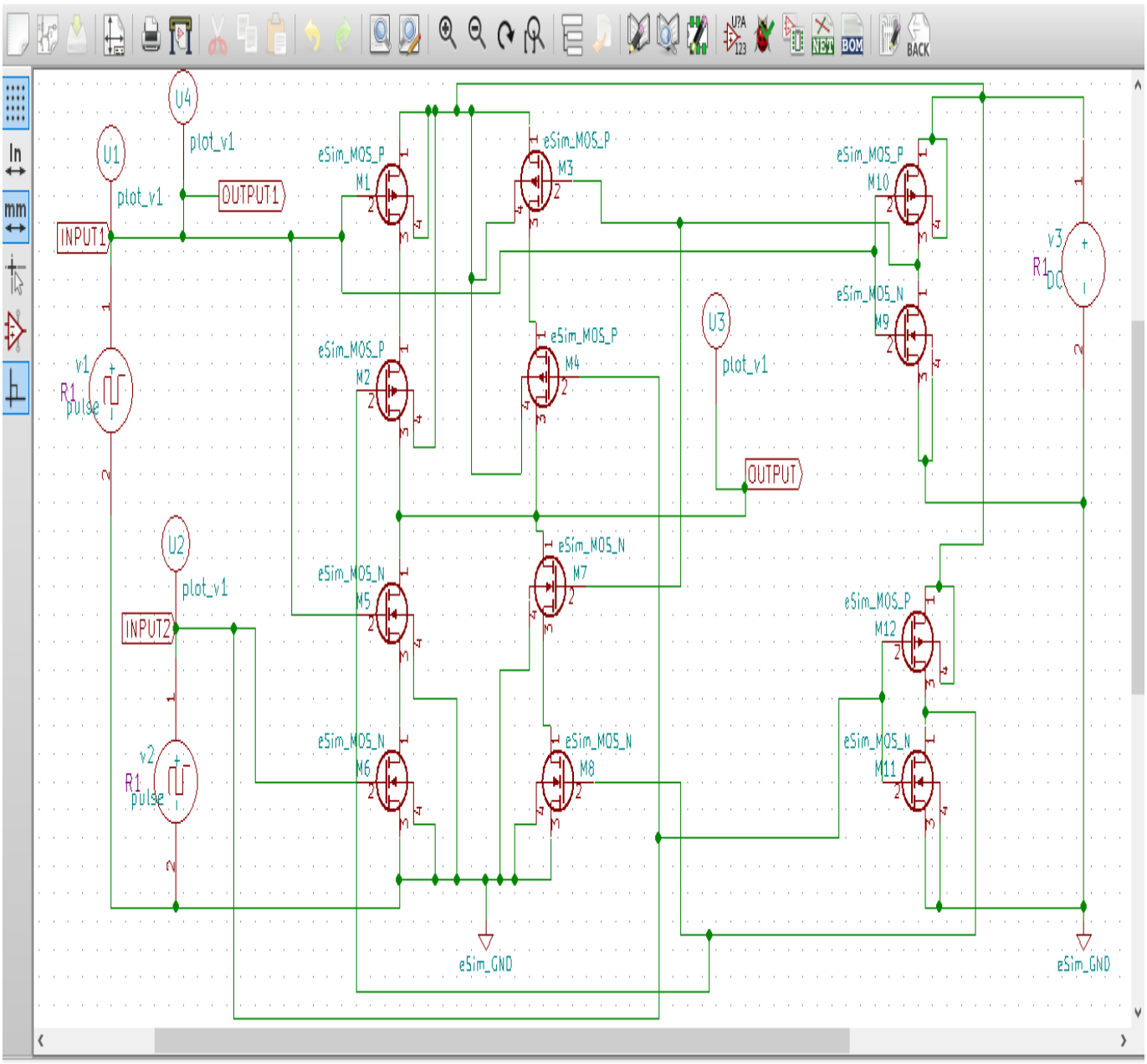

FIGURE 1. REVERSIBLE XOR FULL ADDER

SIMULATION RESULTS:

Ngspice plots:

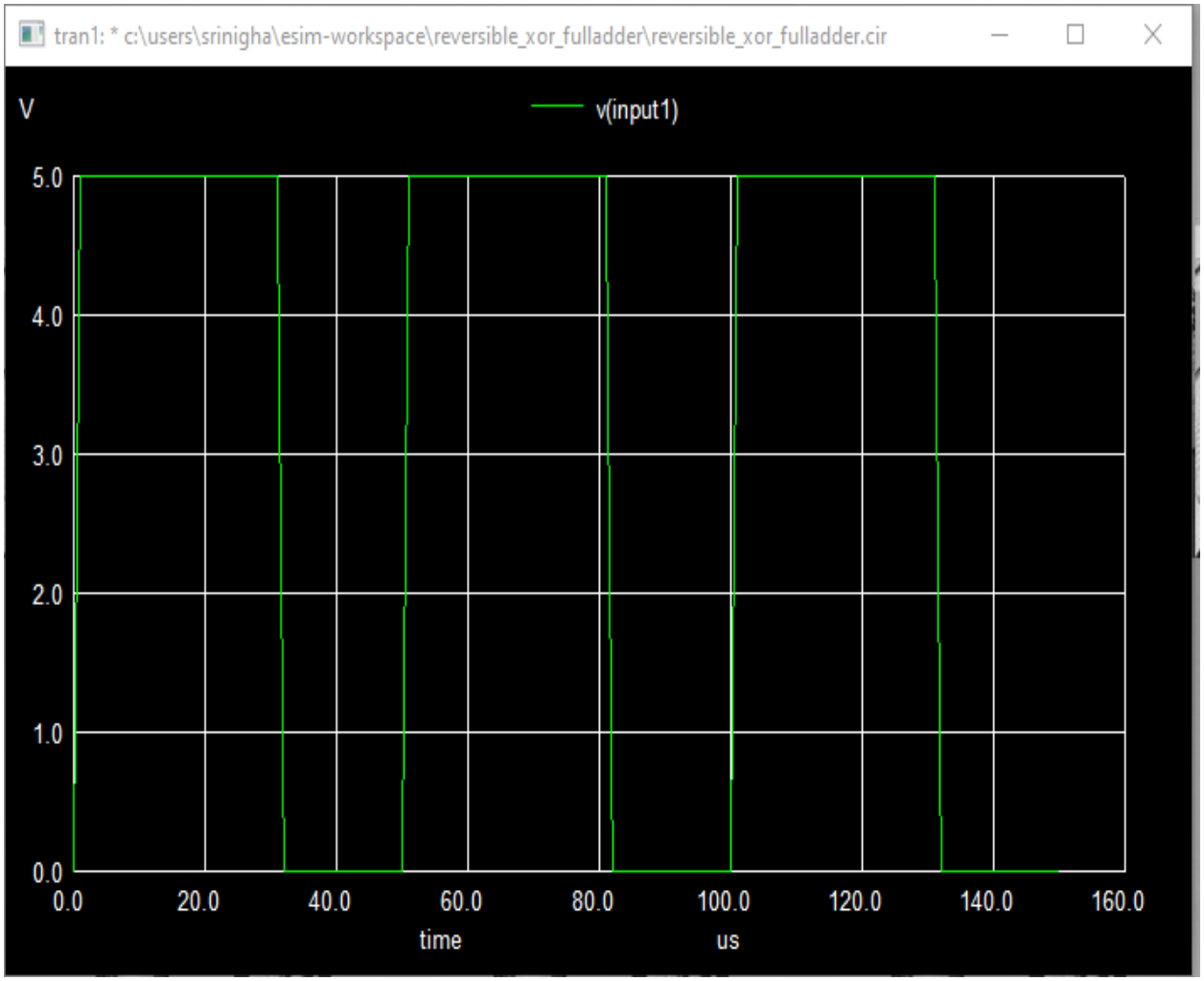

FIGURE 2. Ngspice Input 1 plot

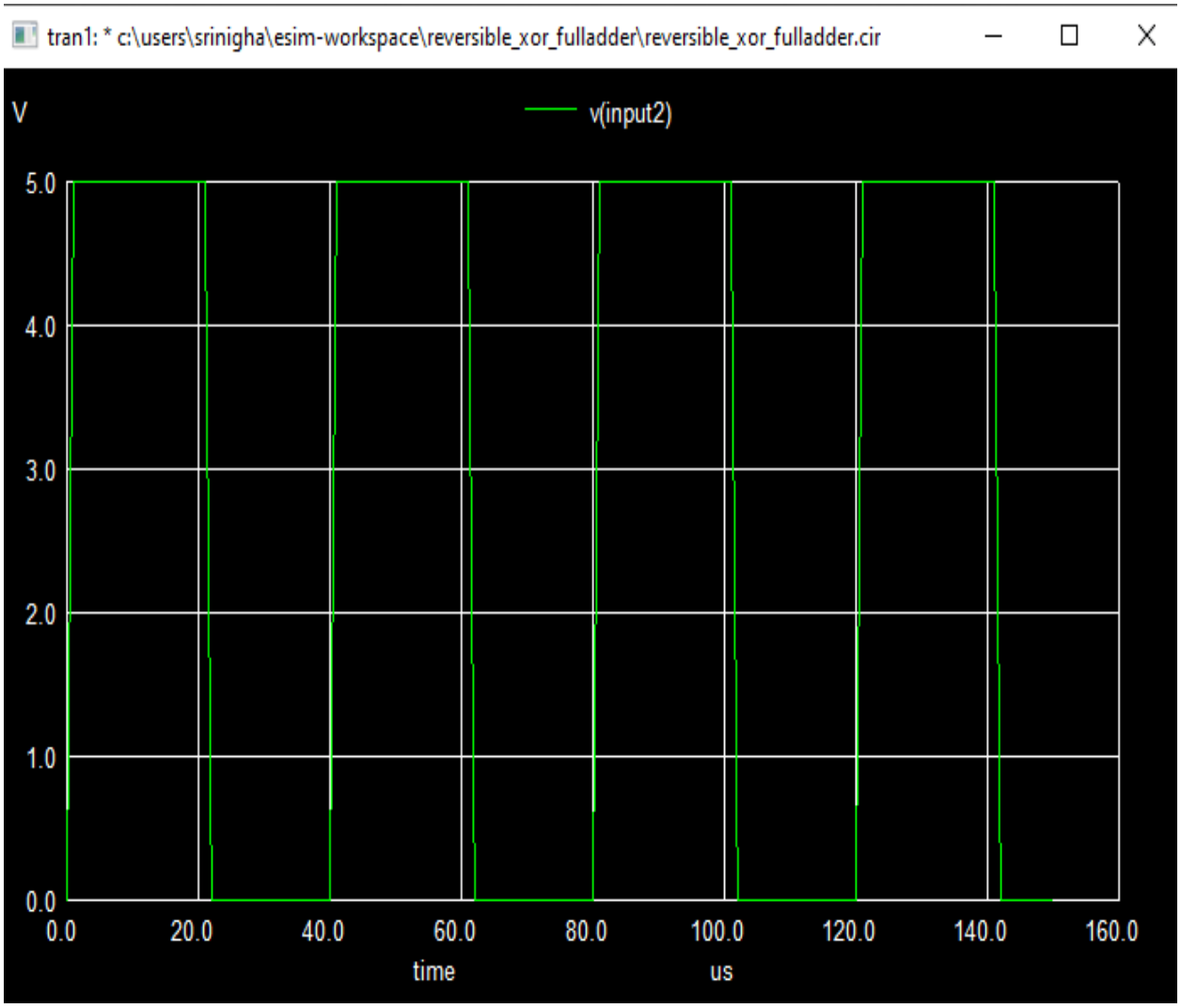

FIGURE 3. Ngspice Input 2 plot

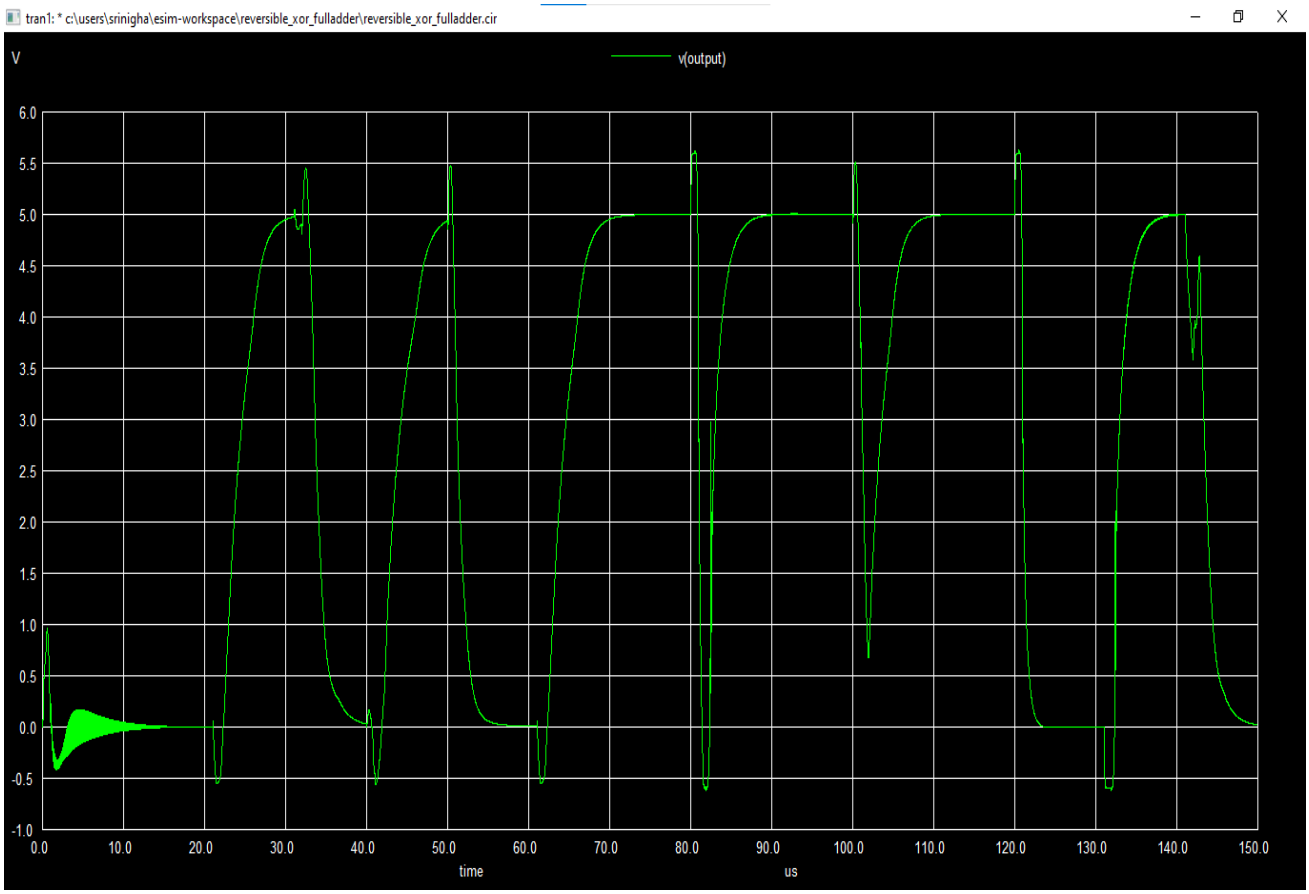

FIGURE 4. Ngspice Output1

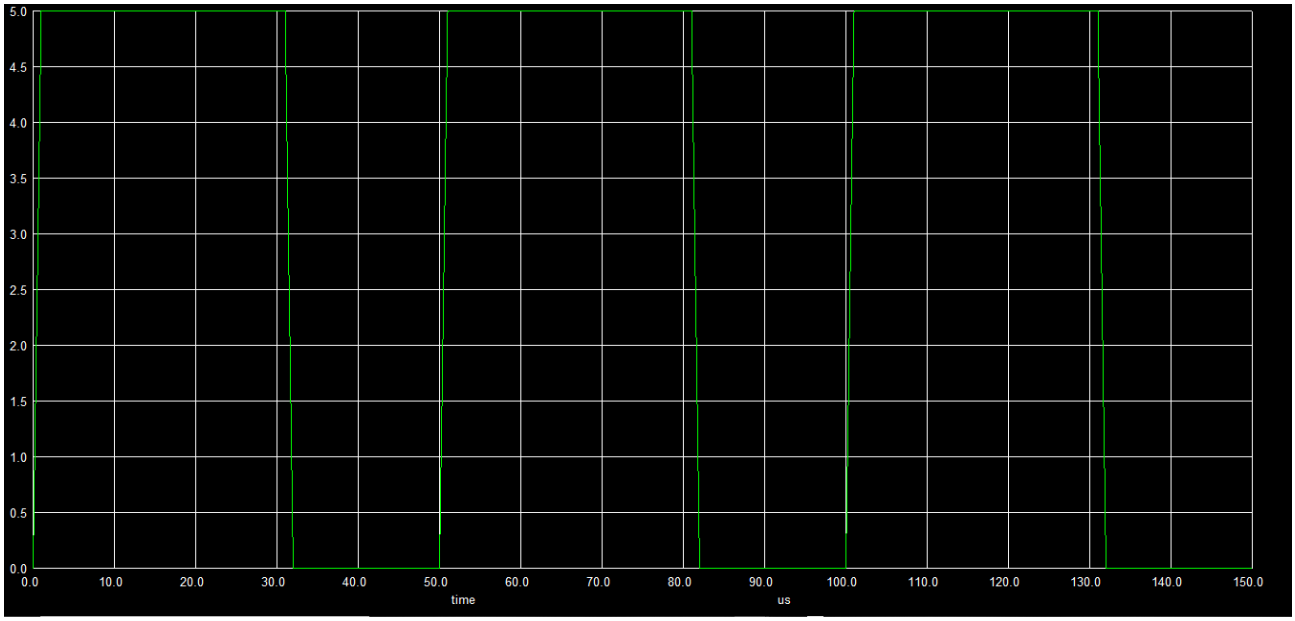

FIGURE 5. Ngspice Output 2

Python Plots:

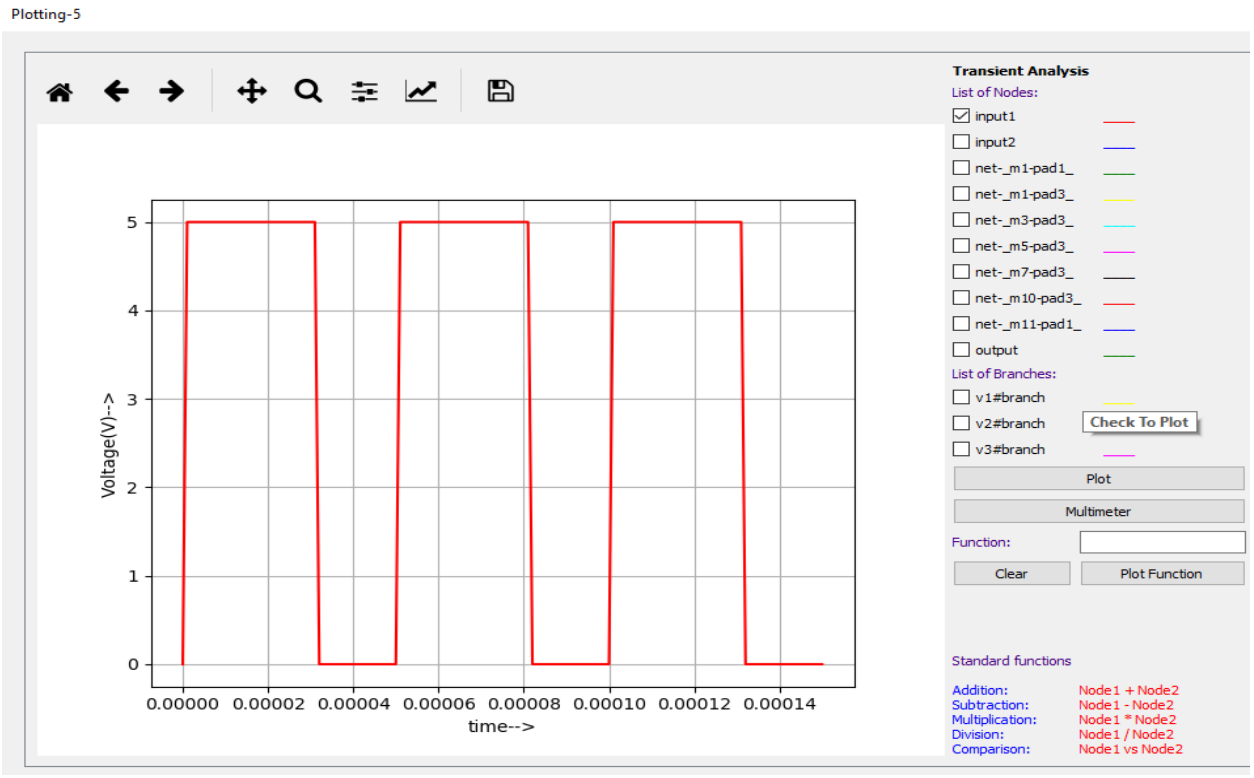

Figure 6. Python Plot Input1

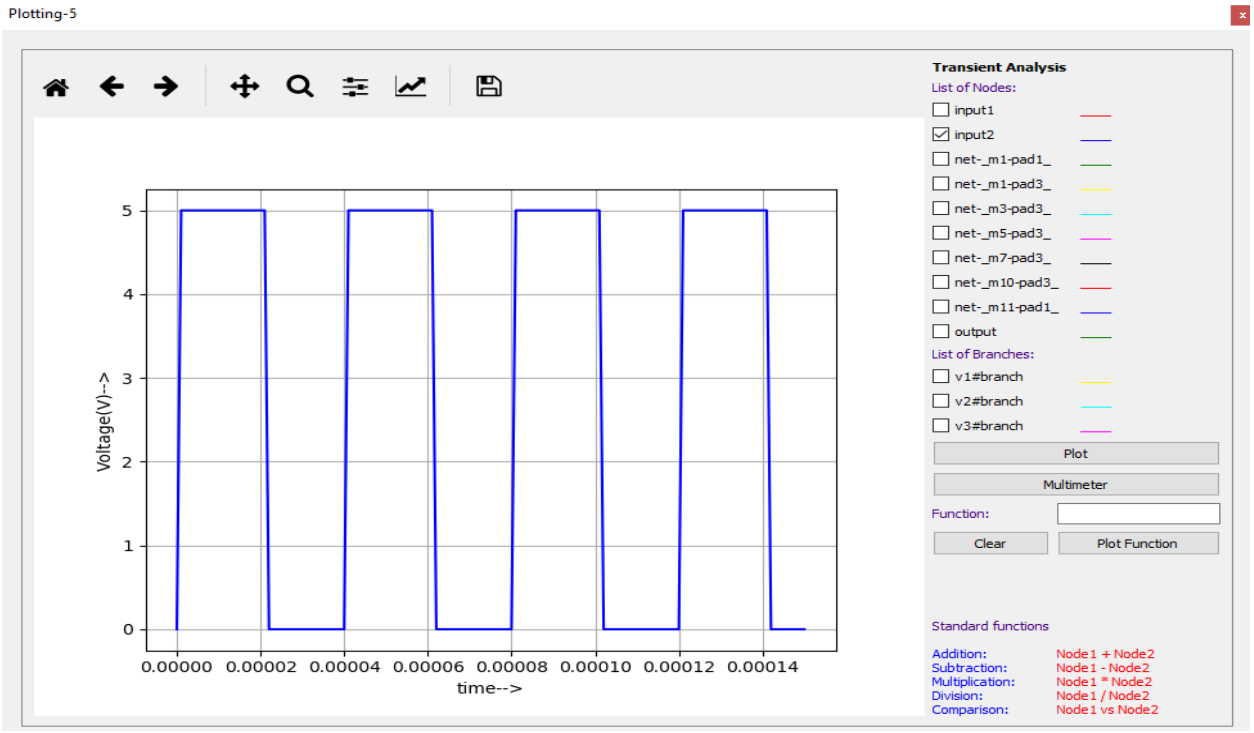

FIGURE 7. Python Plot Input 2

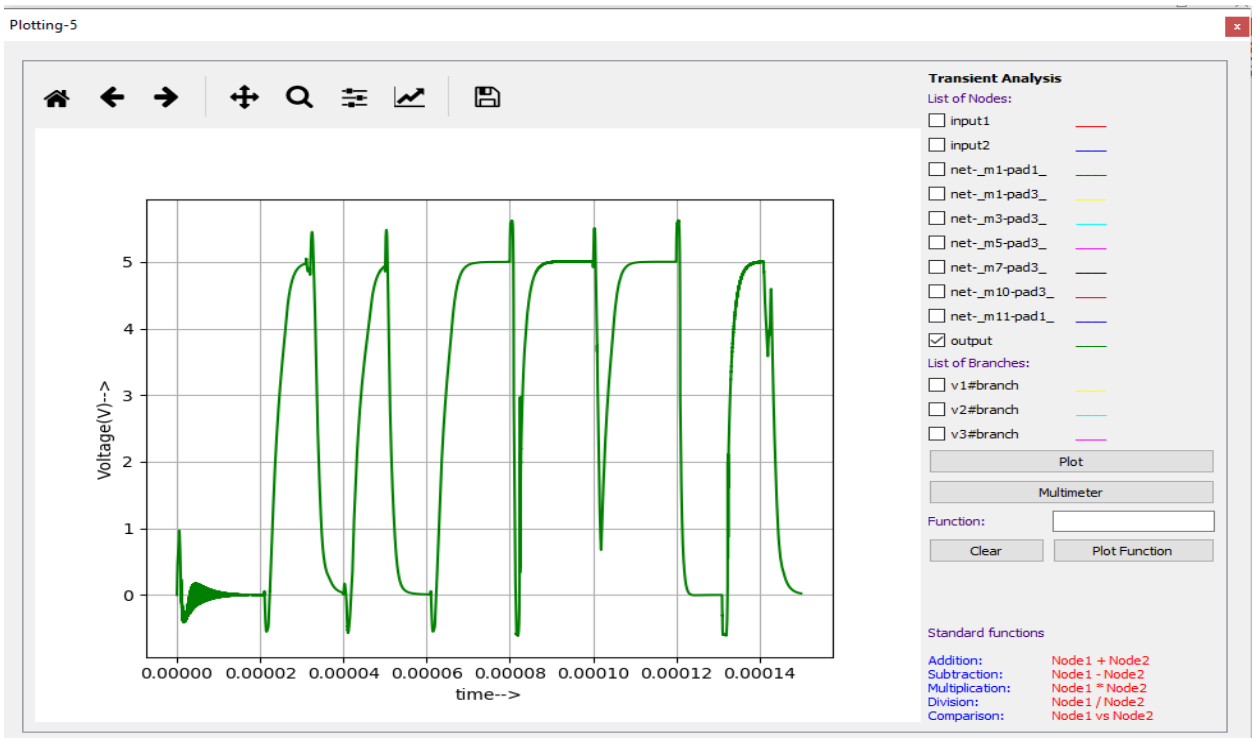

FIGURE 8. Python Plot Output

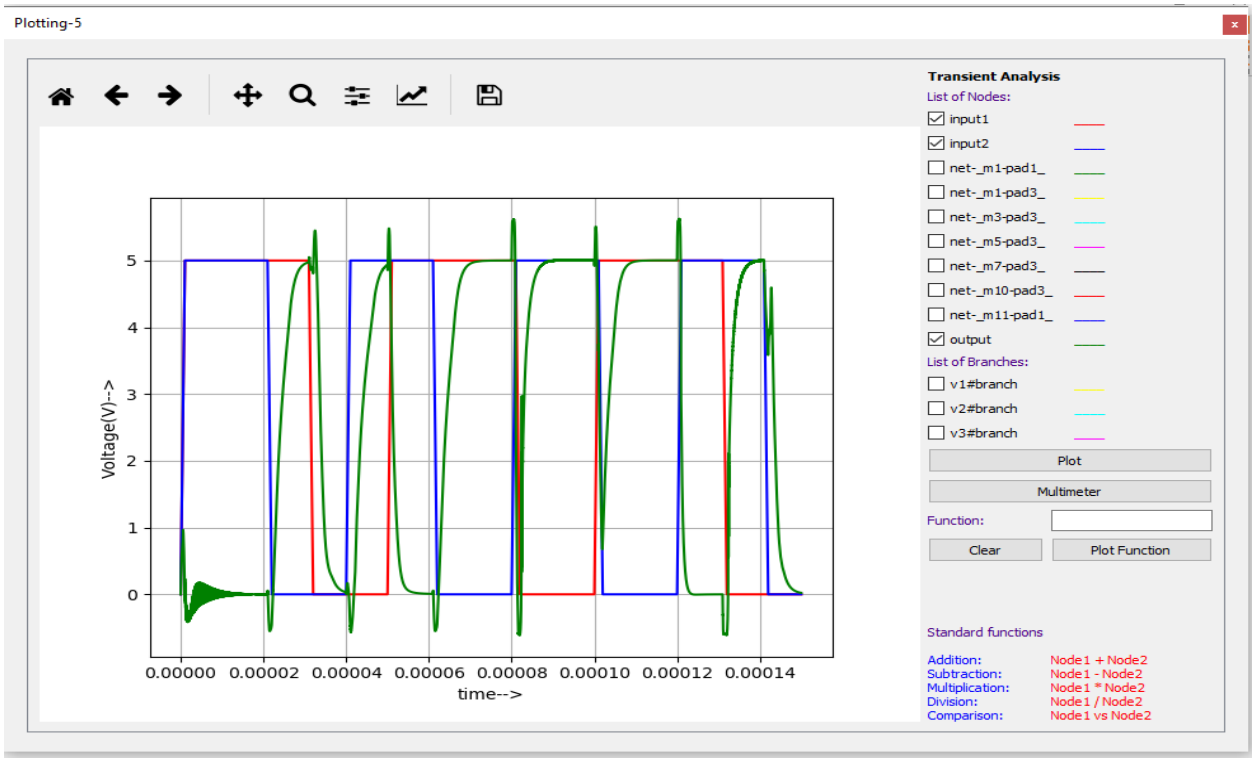

FIGURE 9. Python Plot of Reversible XOR Full Adder

Conclusion:

Thus, we have studied the Reversible XOR Full Adder using eSim and we get the appropriate waveforms.

References:

keivan Navi and M. Haghparast. A novel reversible full adder circuit for nanotechnology based systems.
https://scialert.net/fulltext/?doi=jas.2007.3995.4000.