

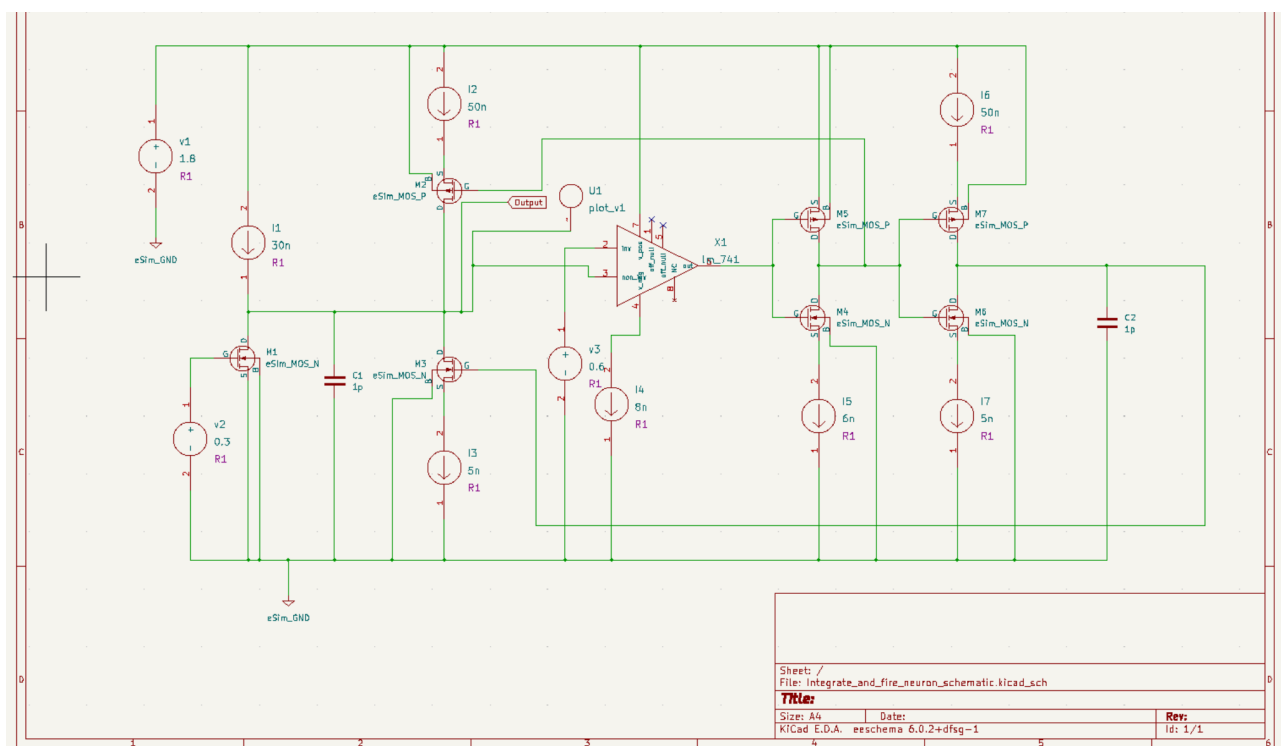
# Abstract for Simulating The Voltage-Amplifier Integrate-and-Fire (I&F) Neuron in eSim FOSSEE

**Title** :- The Voltage-Amplifier Integrate-and-Fire (I&F) Neuron

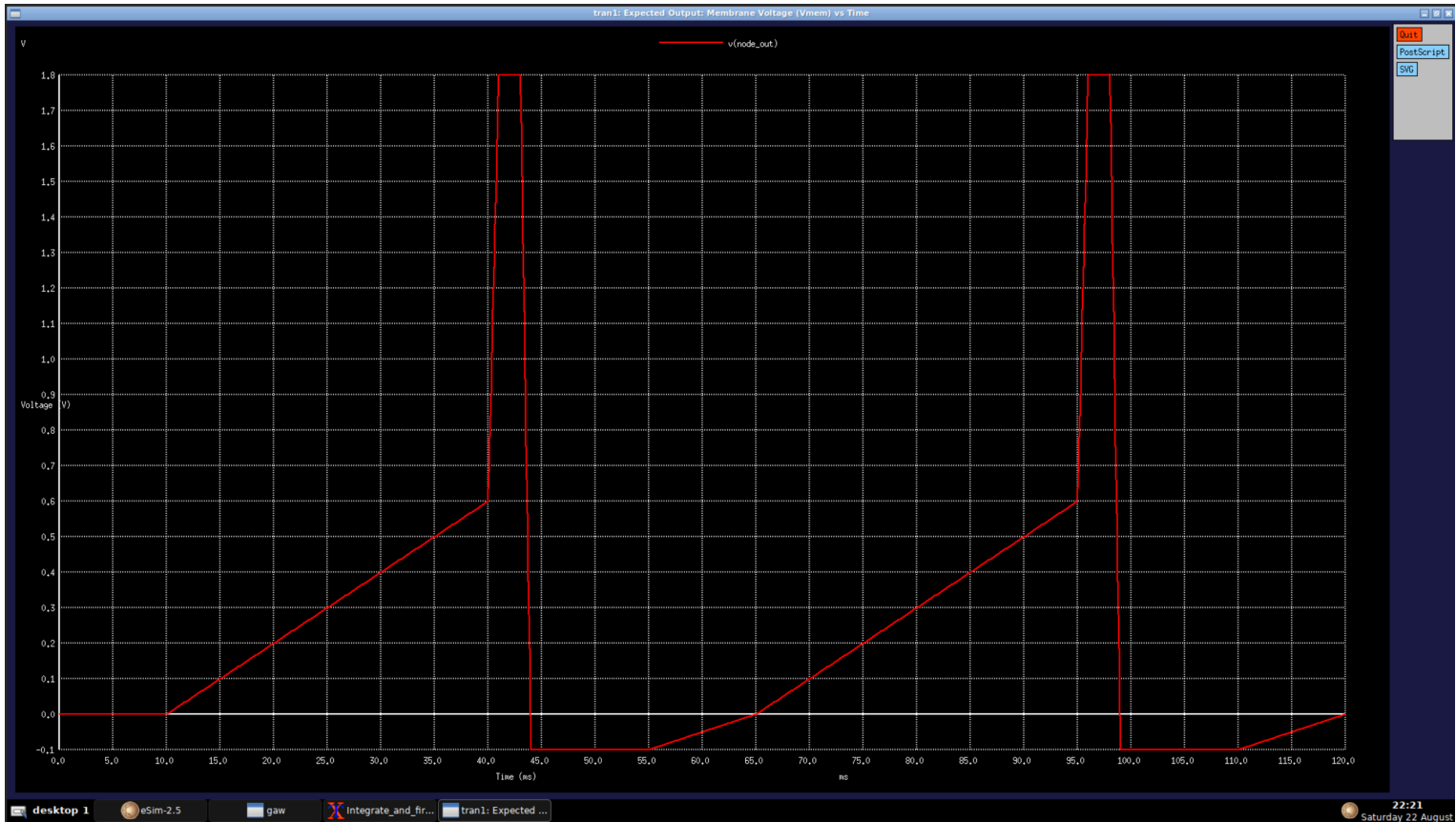
**Theory/Description** :-

Simulating a neuromorphic VLSI circuit that emulates biological action potentials using analog CMOS design. Based on the Axon-Hillock and Voltage-Amplifier topology, the circuit integrates an input current onto a membrane capacitor. Upon crossing a specific voltage threshold, a positive-feedback amplifier stage generates a discrete voltage spike and triggers a self-resetting mechanism. The simulation will utilise Ngspice transient analysis to observe the temporal spiking behaviour and inter-spike intervals under varying input currents.

**Circuit Diagram** :-



## Results/Outputs :-



## References :-

- G. Indiveri et al., "Neuromorphic silicon neuron circuits," *Frontiers in Neuroscience*, vol.5, p. 73, May 2011.
- *Analog VLSI and Neural Systems* by C. A. Mead (1989).
- *Analog VLSI: Circuits and Principles* by S.-C. Liu, J. Kramer, G. Indiveri, T. Delbrück, and R. Douglas (2002).