

Title of the experiment

Analysis of opamp741 tester in eSim

Theory:

We have many applications of opamp and these opamp used should be in good working condition. That is, we should have one circuit which would check the IC741 whether it is working or not. It can be done by using opamp IC741 tester circuit. We just need to place the op-amp LM741 on right place and if the Op-amp is in good condition then output LED will flash or Blinks, and if Op-amp is faulty then either LED will remain ON or OFF continuously.

Working of the circuit is simple and straight forward. The IC to be tested is configured in voltage comparator mode. Voltage at pin 3 (non inverting pin) is fixed where voltage at pin 2 (inverting pin) varying due to charging and discharging of capacitor C1. Where battery is connected to the circuit the voltage at pin 3 is high in compare to voltage at pin 2 due to charging of capacitor, as a result output of IC become high and LED start to glow. At this instant capacitor start to charge through the resistor R5. When charge (voltage) of capacitor exceed voltage at inverting pin (pin 2), the output of IC become LOW, as a result LED stop to glow. When voltage at capacitor become higher then inverting input pin it start to discharge and again output of IC become high. If the LED doesn't blink in fixed interval of time i.e. either stay ON or OFF, the IC which is testing is faulty.

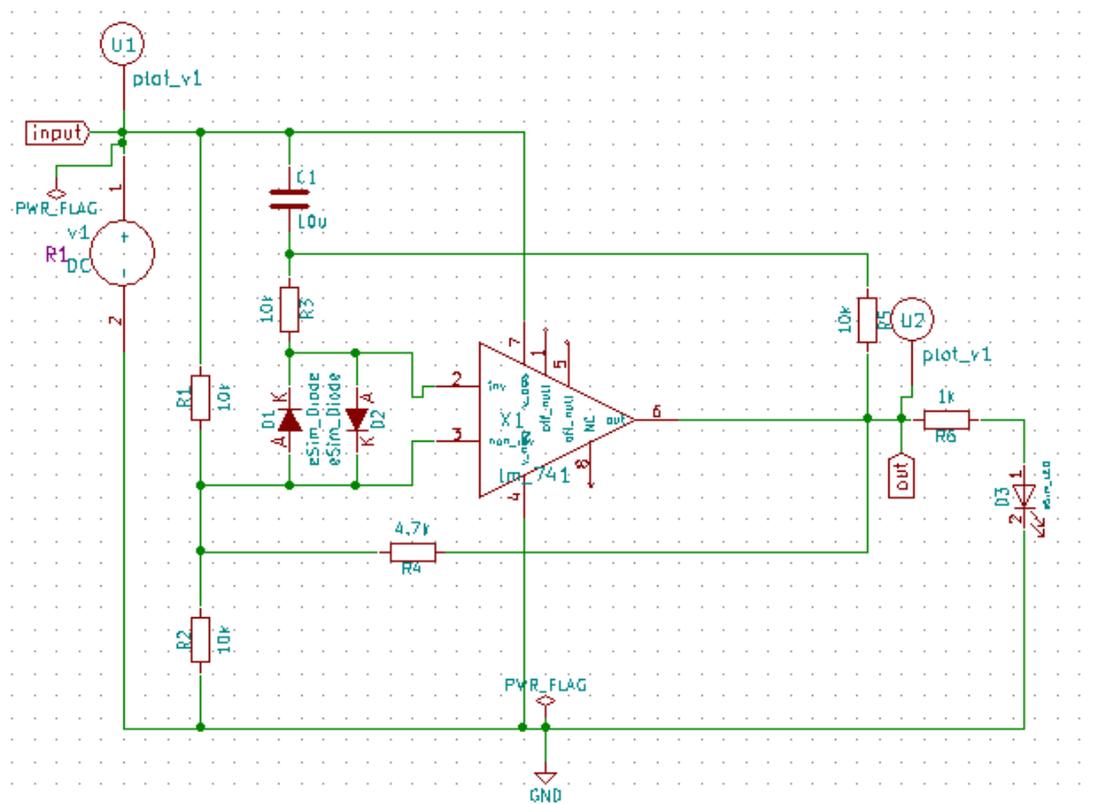


Figure 1: Schematic of opamp 741 tester

Simulation Results:

1. Ngspice plots:

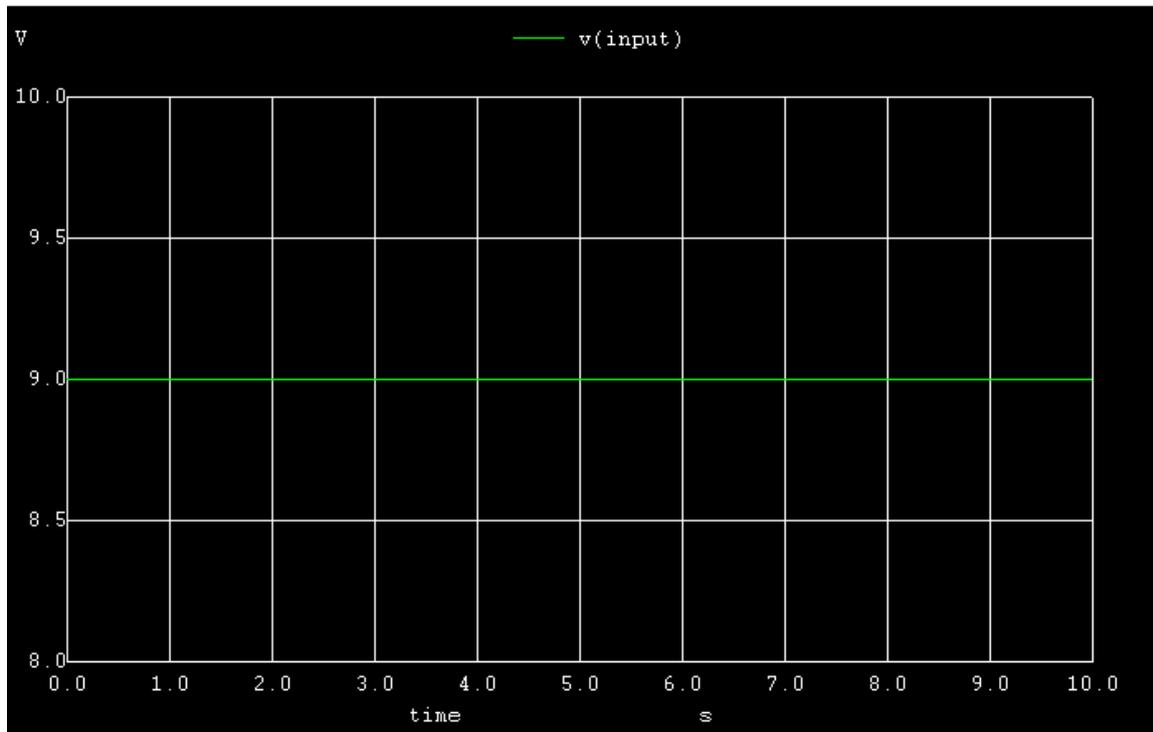


Figure 2: ngspice input plot

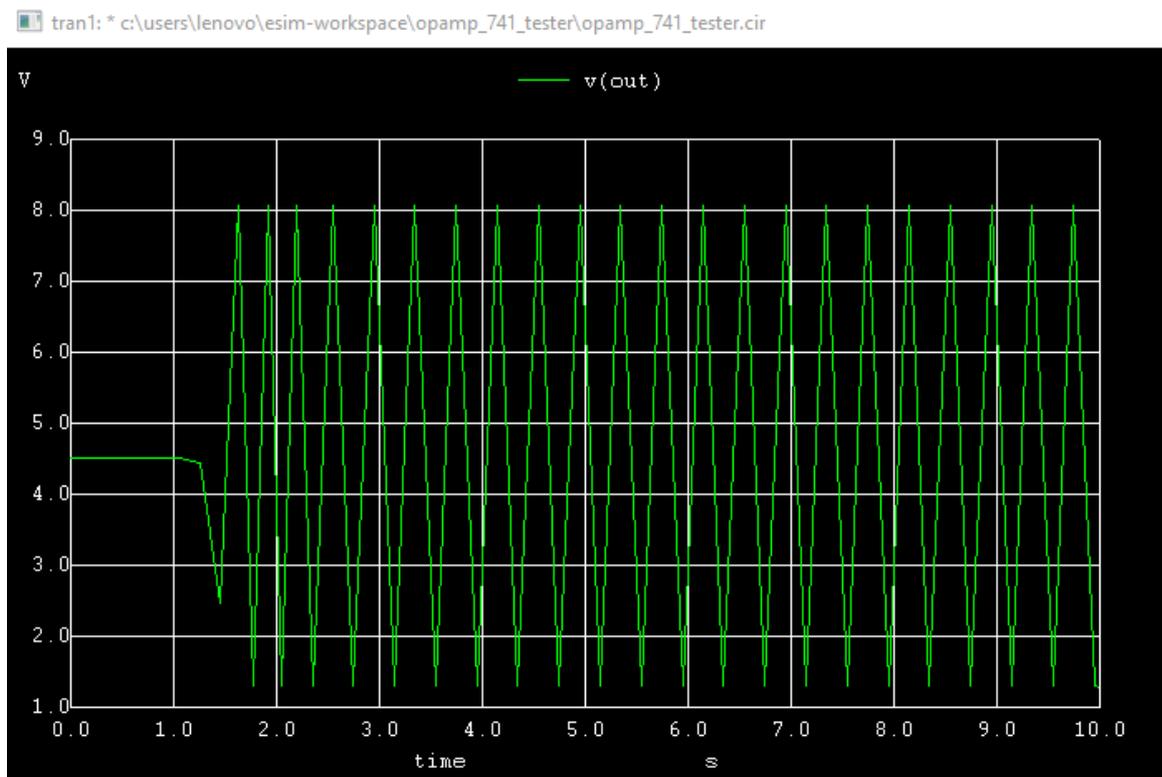


Figure 3: ngspice output plot

Python Plot:

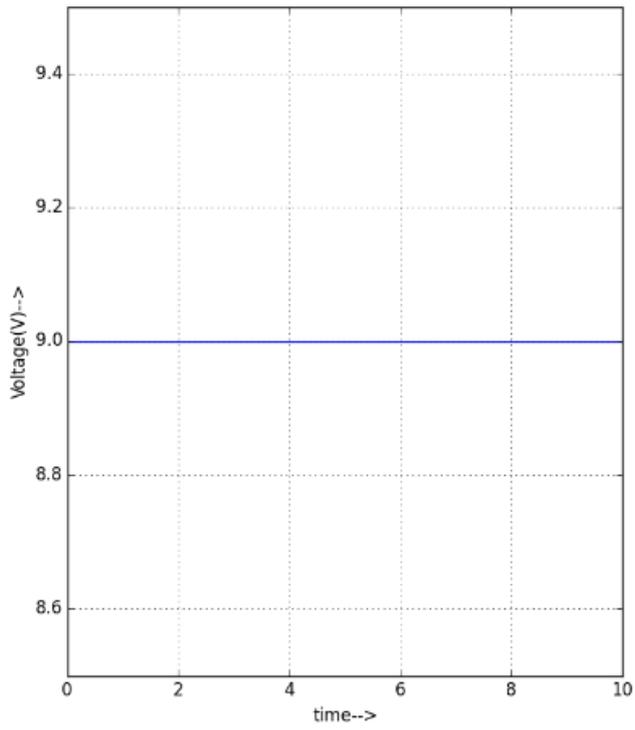


Figure 4: Python input plot

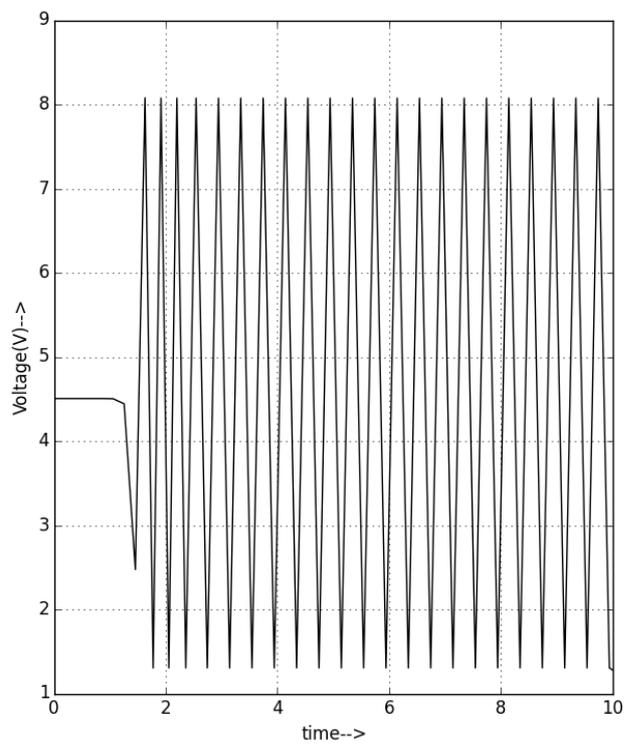


Figure 5: Python output plot

Conclusion :

Thus, we have studied the opamp 741 tester and the simulation plot of ngspice and python plot obtained in eSim.

Reference:

- 1 <https://bestengineeringprojects.com/operational-amplifier-741-tester/>
- 2 <https://circuitdigest.com/electronic-circuits/opamp-lm741-tester-circuit>