



The Islamic University of Gaza

Faculty of Engineering

Department of Computer Engineering

Digital Electronics LAB

[LAB 01]

Student Name

Ahmed M. Al-Shaikh Khalil

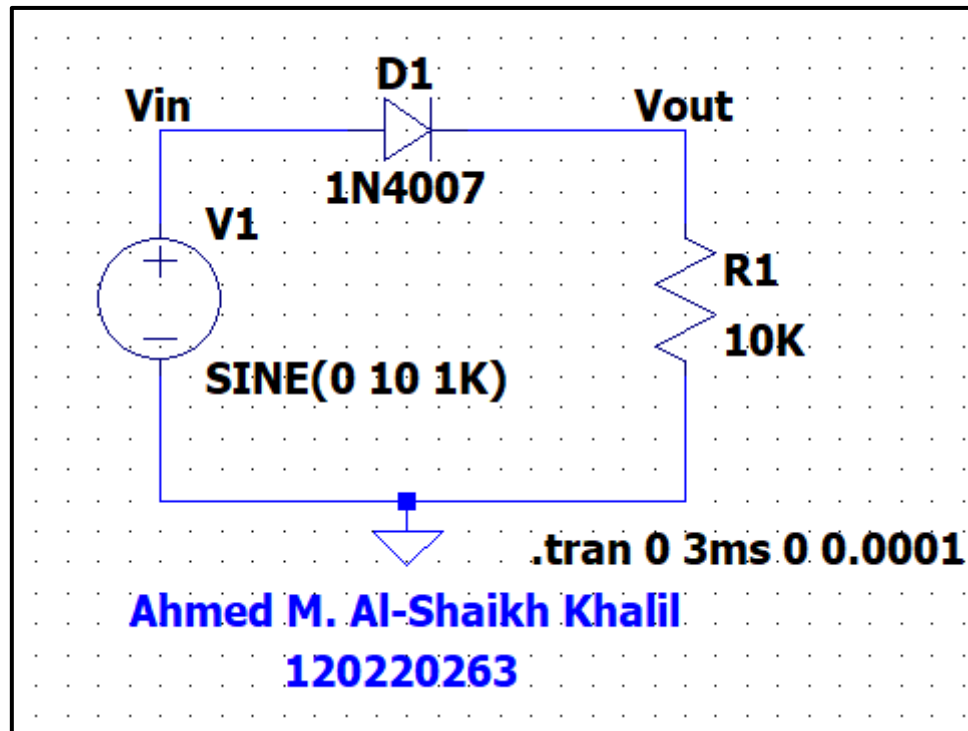
Student ID

120220263

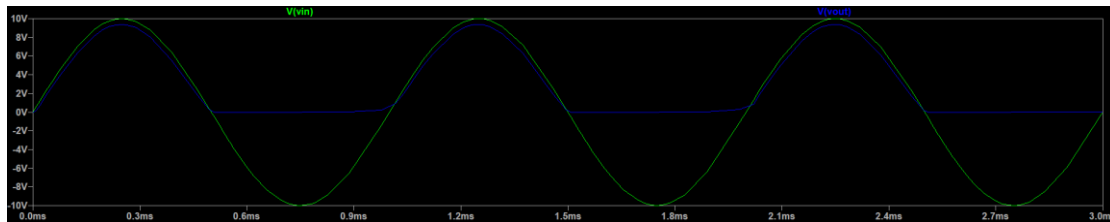
Supervisor

Eng. Saja Nabhan

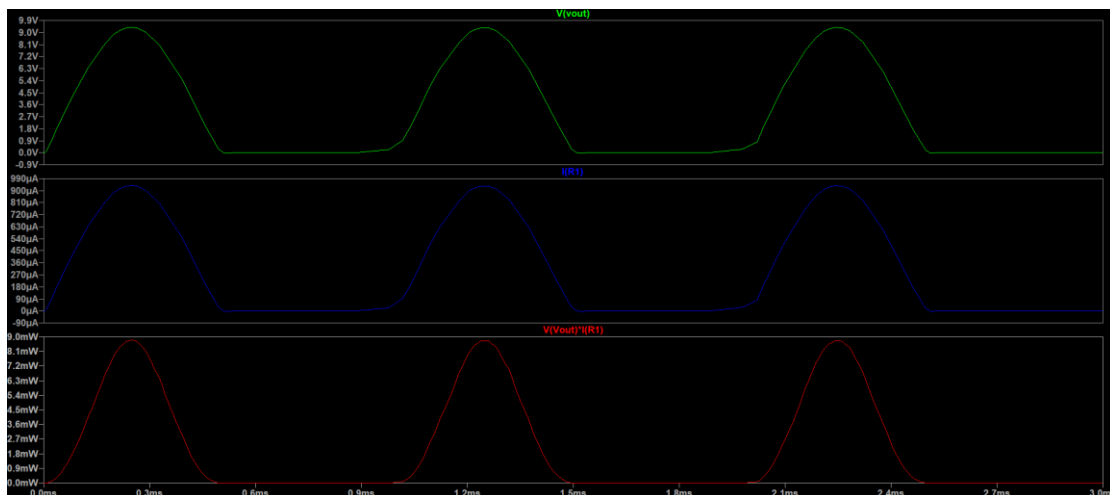
☯ Part (1): Transient Analyses:



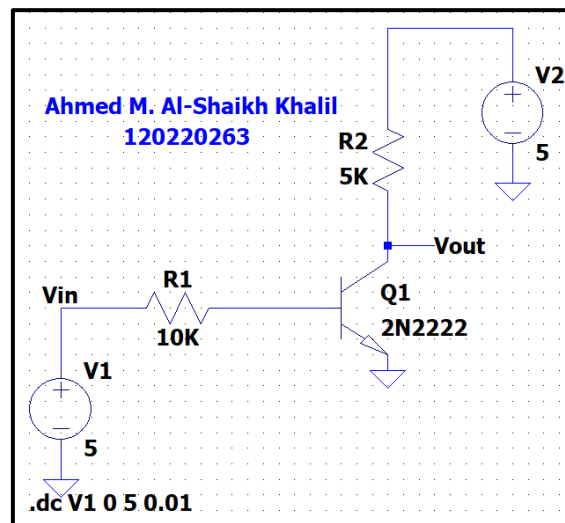
A. Graph V_{out} vs V_{in} in the same graph:



B. Graph V_{out} , $I(R1)$ and $P(R1)$ in 3 different plot panes.

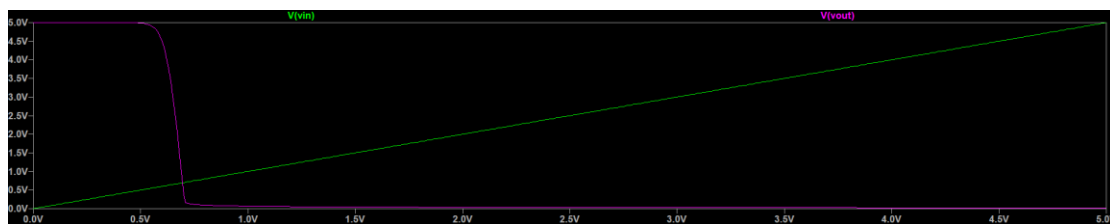


☯ Part (2): DC Sweep:

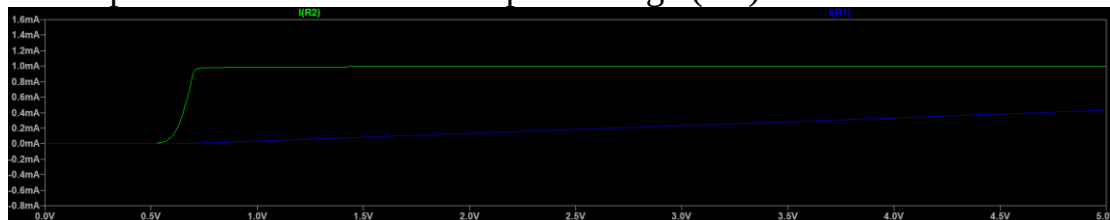


A. What is this circuit called? **BJT Inverter** or **RTL Inverter**

B. Graph V_{out} vs V_{in} in the same graph when the Input Voltage V_1 varies between 0–5V.



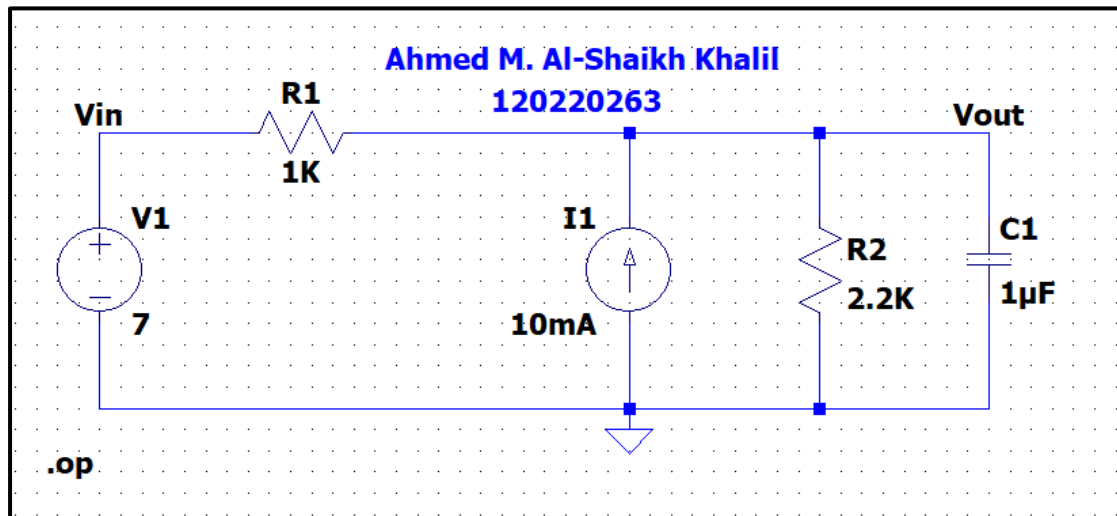
C. Graph I_{in} vs I_{out} when the Input Voltage (V_1) varies between 0-5V.



D. In the previous step “c” try to rotate the Base Resistor R2 and do the simulation again, what have you noticed?

The current through resistor R2 appears positive in the simulation results due to LTspice’s convention of defining current direction based on the component's pin order. This means that the software measures current according to the predefined polarity of the element, regardless of the actual direction of current flow in the physical circuit.

Part (3): DC operating point:



a. Try to run DC operating point simulation, **what is the missing in this circuit?**

In the original circuit provided with the lab, the ground reference node was not included. I reconstructed the circuit in LTspice and added the necessary ground connection to ensure proper simulation functionality.

b. After add the missing element, run the simulation and write down: **I(R1), I(R2) and V_{out} .**

