EC 205 Analog Electronics Lab

Experiment No. 10

Expt. 10: Study of Comparator and Schmitt Triggers

Aim:

To design and study a μA741 based Comparator, Inverting Schmitt trigger and non-inverting Schmitt trigger circuits.

Circuit Diagrams:

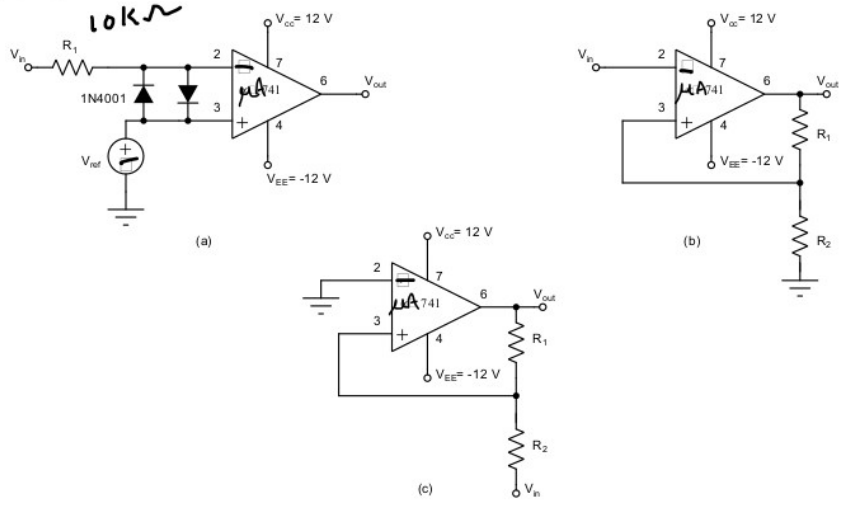

Figure 1: (a) Comparator (b) Inverting Schmitt trigger (c) Non-inverting Schmitt trigger

1000Hz

1. Test the comparator for $v_{in} = 5\ sin(200\pi t)$ and $V_{ref} = 0$ V, 2 V and -3 V. (In hardware lab: Observe the transfer characteristic of the circuit by setting the DSO in X-Y mode.)

2. Design the inverting Schmitt trigger circuit for V_{LT} = -3 V and V_{UT} = 3 V. Assume the saturation voltage, $V_{sat} = V_{CC} - 1$ V. Observe the input and output waveforms. (In hardware lab: Observe the transfer characteristic of the circuit by setting the DSO in X-Y mode). What will be the output if the amplitude of input is set to 2 V?

3. Design the non-inverting Schmitt trigger circuit for V_{LT} = -4 V and V_{UT} = 4 V. Assume the saturation voltage, $V_{sat} = V_{CC} - 1$ V. Observe the input and output waveforms. (In hardware lab: Observe the transfer characteristic of the circuit by setting the DSO in X-Y mode.)

Think about these

- What happens if the input terminals of opamp in comparator circuit are interchanged?
- Can you design a Schmitt trigger circuit where $|V_{LT}| \neq |V_{UT}|$? If yes, how? Design any one circuit.