AIC SELF STUDY [15ES4GCAIC]

in

ELECTRONICS AND COMMUNICATION ENGINEERING

by

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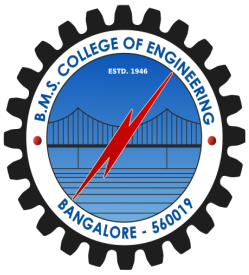

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Question 1

Plot the frequency response curve for any practical circuit using 741 op-amp and verify the following equation:

$$(Bandwidth * Gain)_{openloop} = (Bandwidth * Gain)_{closedloop}$$

Solution

We solve each solution algebraically to determine a possible constant c.

Part One

$$\begin{aligned} n^2 + n + 1 = & \\ & \leq n^2 + n^2 + n^2 \\ & = 3n^2 \\ & \leq c \cdot 2n^3 \end{aligned}$$

Thus a valid c could be when $c = 2$.

Part Two

$$\begin{aligned} n^2 + n\sqrt{n} = & \\ & = n^2 + n^{3/2} \\ & \leq n^2 + n^{4/2} \\ & = n^2 + n^2 \\ & = 2n^2 \\ & \leq c \cdot n^2 \end{aligned}$$

Thus a valid c is $c = 2$.

Part Three

$$\begin{aligned} n^2 - n + 1 = & \\ & \leq n^2 \\ & \leq c \cdot n^2/2 \end{aligned}$$

Thus a valid c is $c = 2$.

Question 2

Calculate various DC and AC electrical parameters for a given OPAMP and verify the same with various datasheet.

Solution

Question 3

Design and simulate working of an Instrumentation amplifier for measuring temp change using wheat-stone bridge and instrumentation amplifier.

Solution

Question 4

Design and Simulate a V to I converter with grounded load for an application. Measure sensitivity of the circuit.

Solution

Question 5

Design and Simulate an experiment to Plot transfer characteristics of any practical op-amp.

Solution

Inverting Open Loop Configuration

- The practical Operational Amplifier LM101A was used for this simulation experiment.

The circuit can be constructed as show in Figure 1.

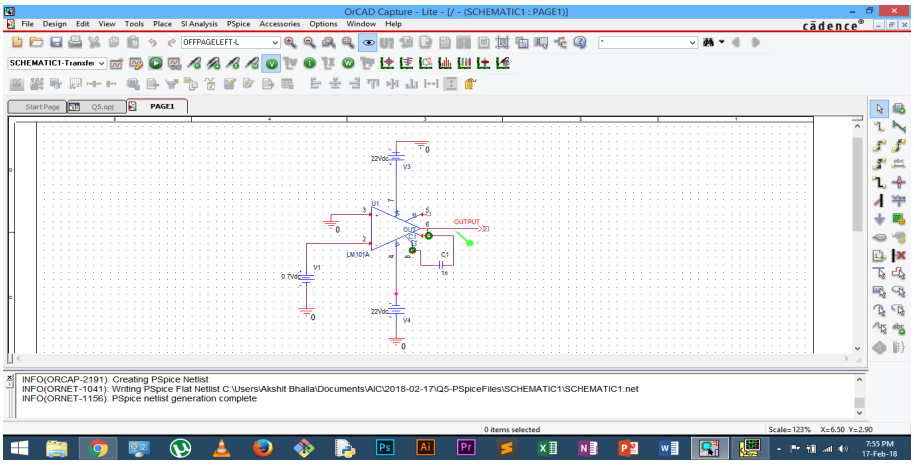

Figure 1: Circuit Diagram

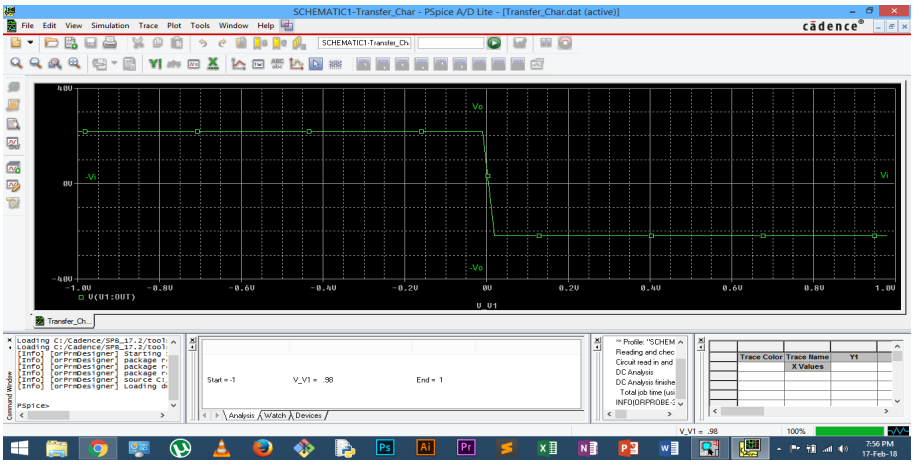

Figure 2: Transfer Characteristics

Open Loop Configuration with Inverting and Non-Inverting Inputs - 1

The circuit can be constructed as show in Figure 3.

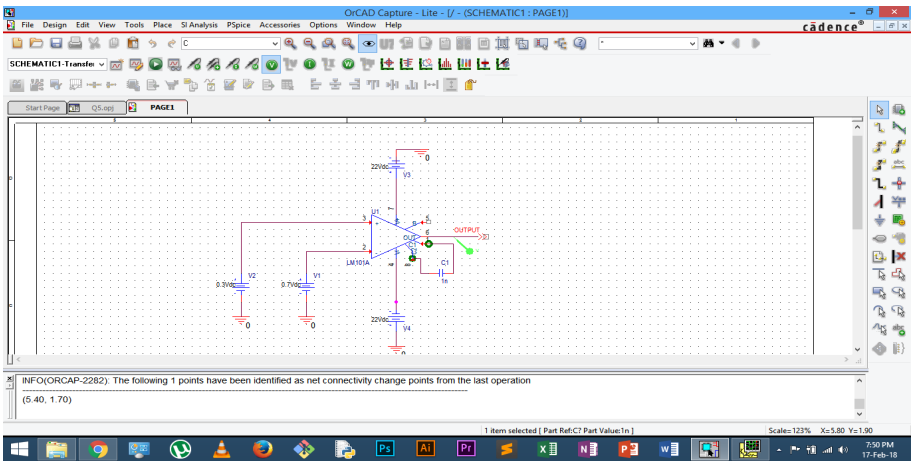

Figure 3: Circuit Diagram

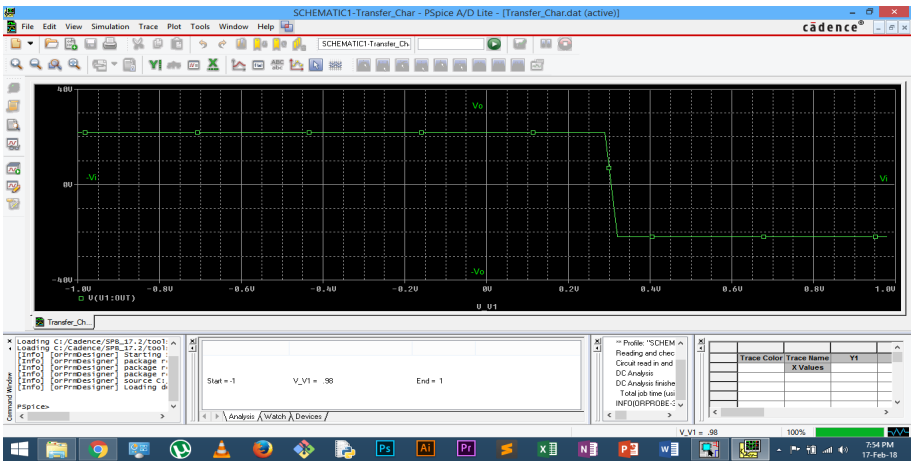

Figure 4: Transfer Characteristics

Open Loop Configuration with Inverting and Non-Inverting Inputs - 2

The circuit can be constructed as show in Figure 5.

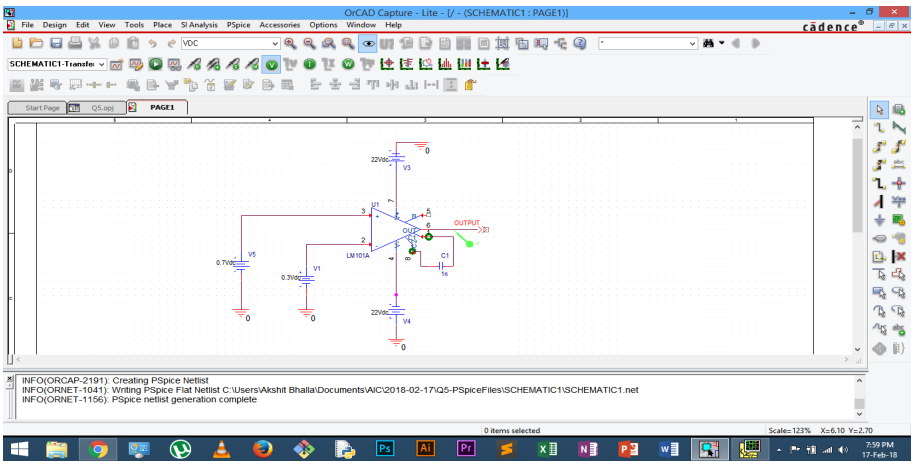

Figure 5: Circuit Diagram

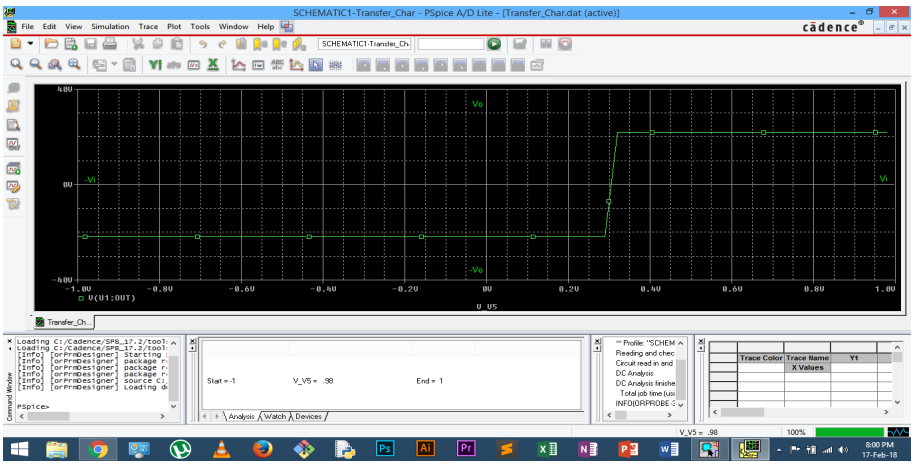

Figure 6: Transfer Characteristics