**Experiment -8**

**Aim:**

1. Design an inverting and non-inverting amplifier using opamp using an F/B network
2. Determine bandwidth of amplifier using ac analysis
3. Evaluate the open-loop gain. Loop gain and close loop gain of both the amplifier (VFB/VTEST) and do ac analysis
4. Comment on the stability of the feedback amplifier

**Apparatus used:** LTSpice software

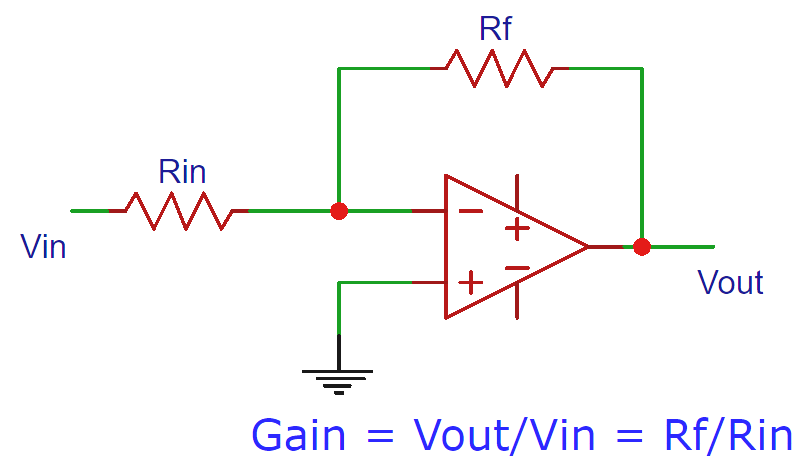
**Theory:**

An **Operational Amplifier**, or op-amp for short, is fundamentally a voltage amplifying device designed to be used with external feedback components such as resistors and capacitors between its output and input terminals

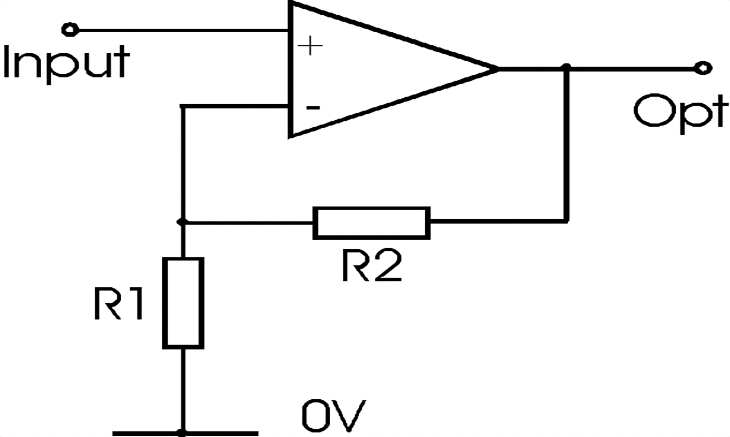
Op-amp Parameter and Idealised Characteristic

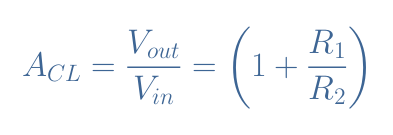
* Open Loop Gain, (Avo): Infinite
* Input impedance, (ZIN): Infinite
* Output impedance, (ZOUT): Zero
* Bandwidth, (BW): Infinite
* Offset Voltage, (VIO): Zero

**Inverting amplifier:**



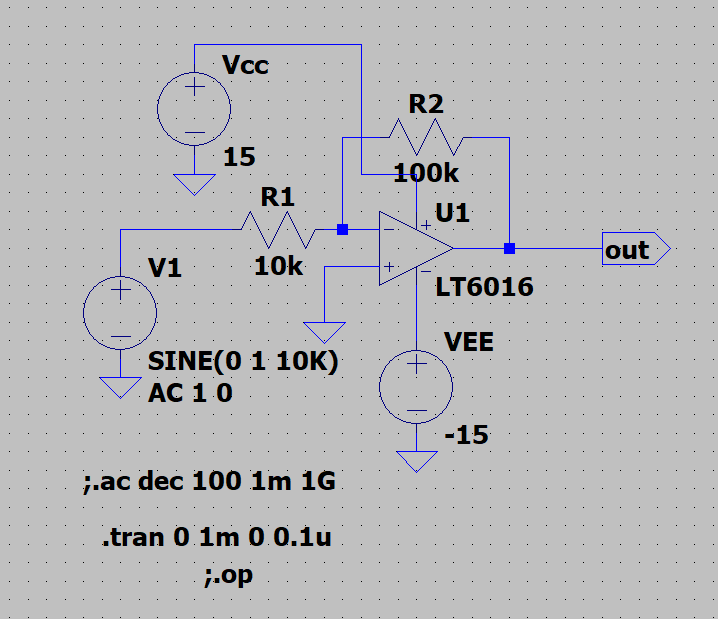
**Non Inverting amplifier:**



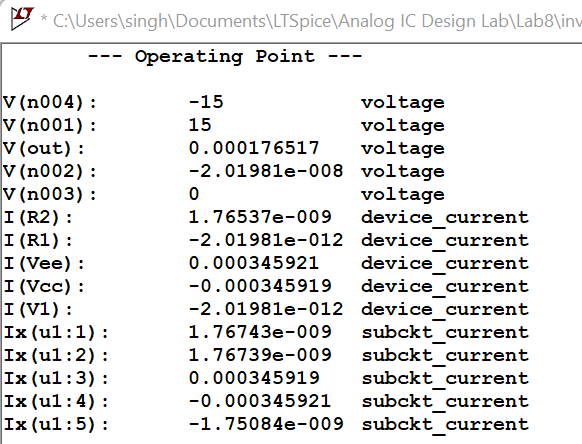


**Circuit Schematic:**

**INVERTING AMPLIFIER:**

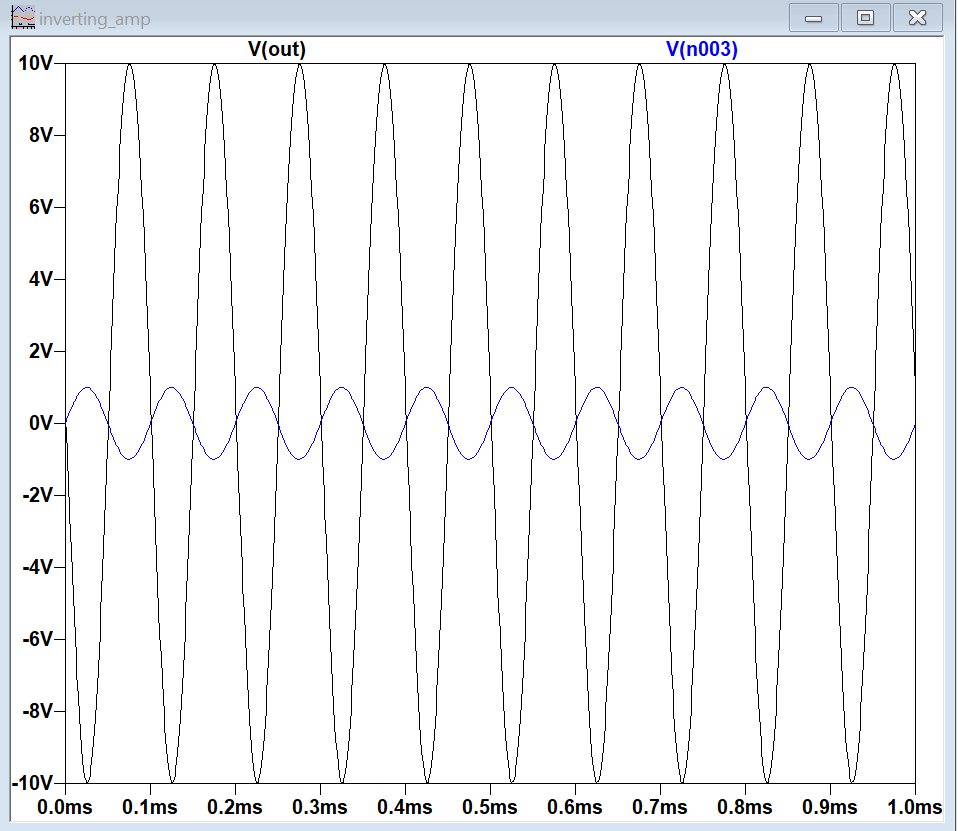
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**DC operating Point:**

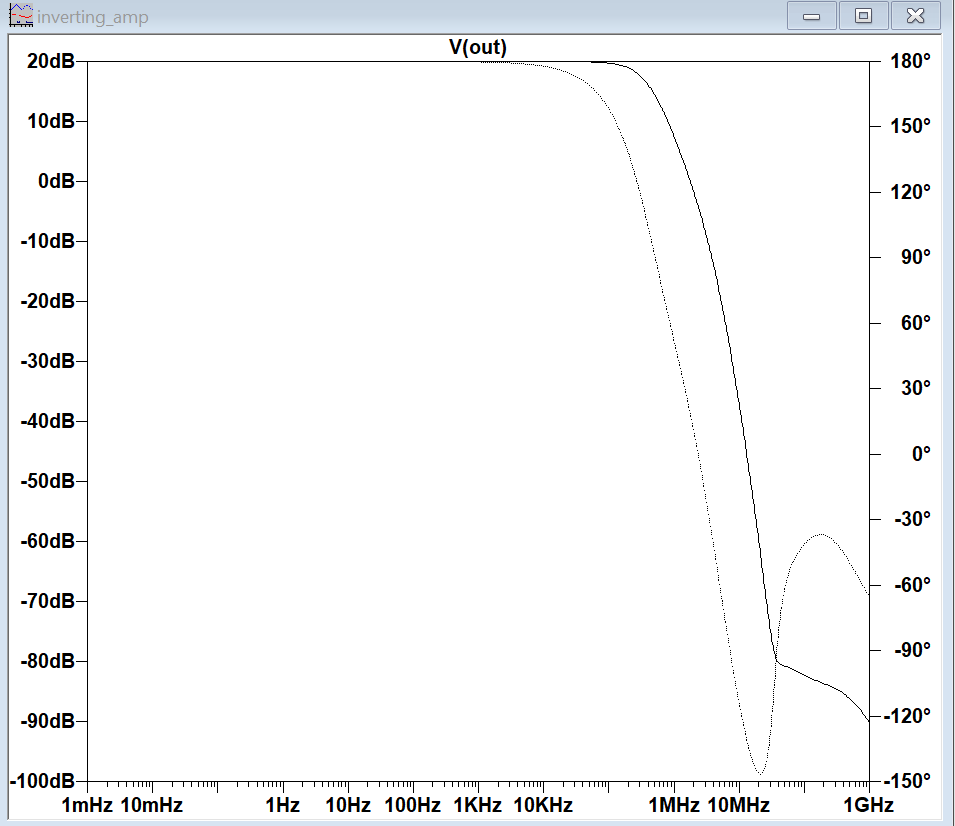
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**Output Waveform:**

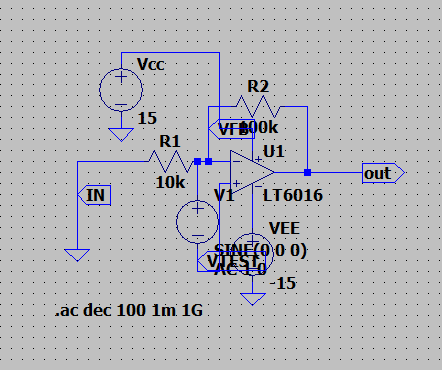
**Transient response:**

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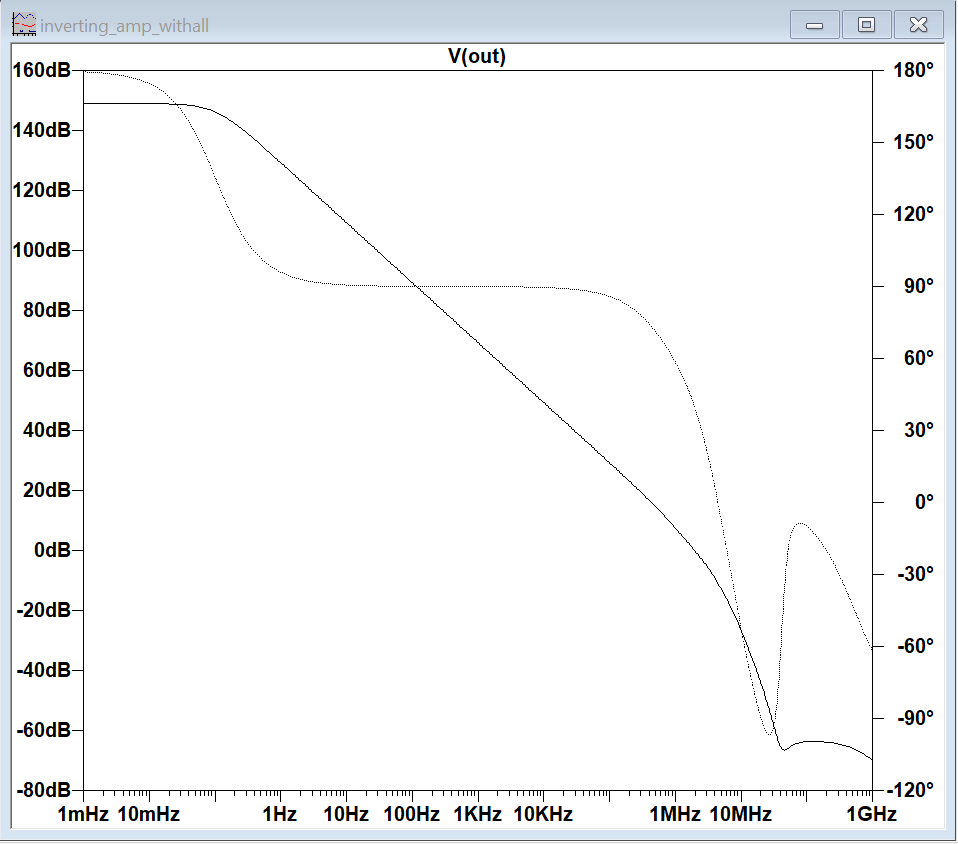
**AC response:**

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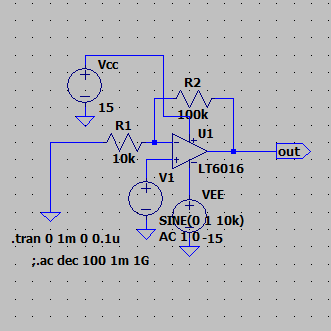
**Inverting amplifier with VTest input**

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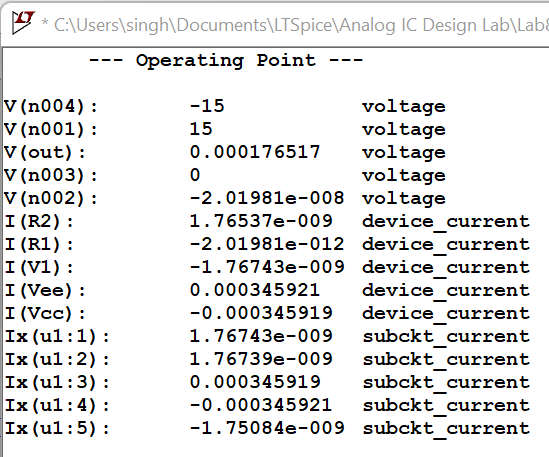
**Waveform:**

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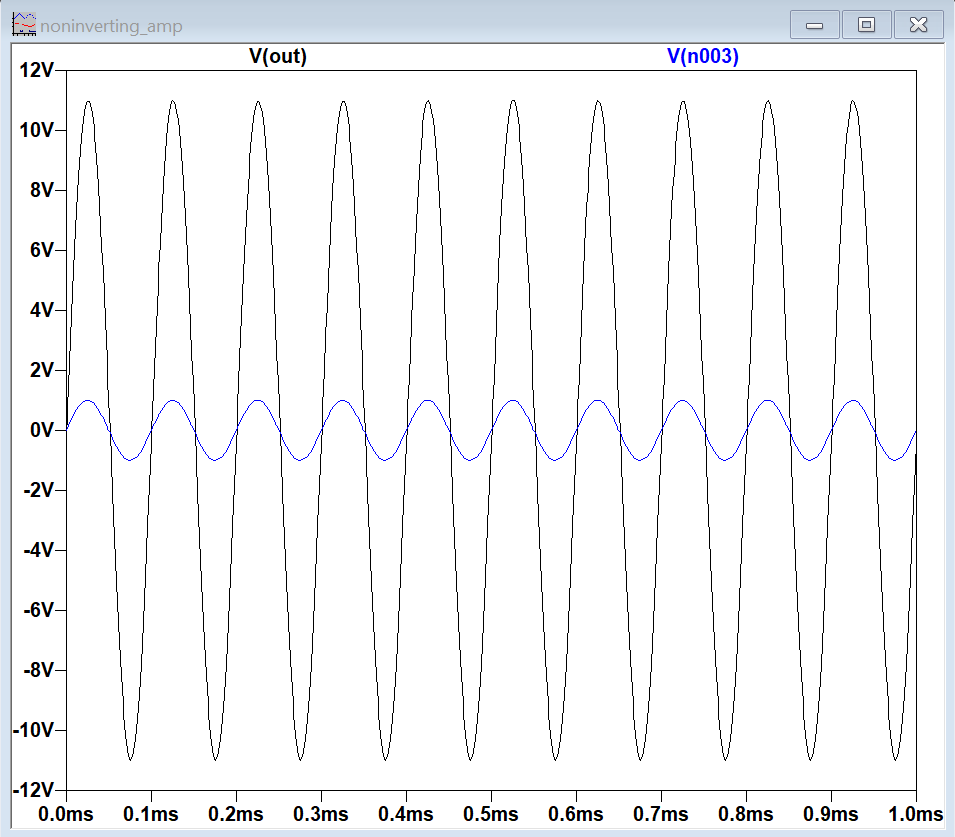
**NON-INVERTING AMPLIFIER:**

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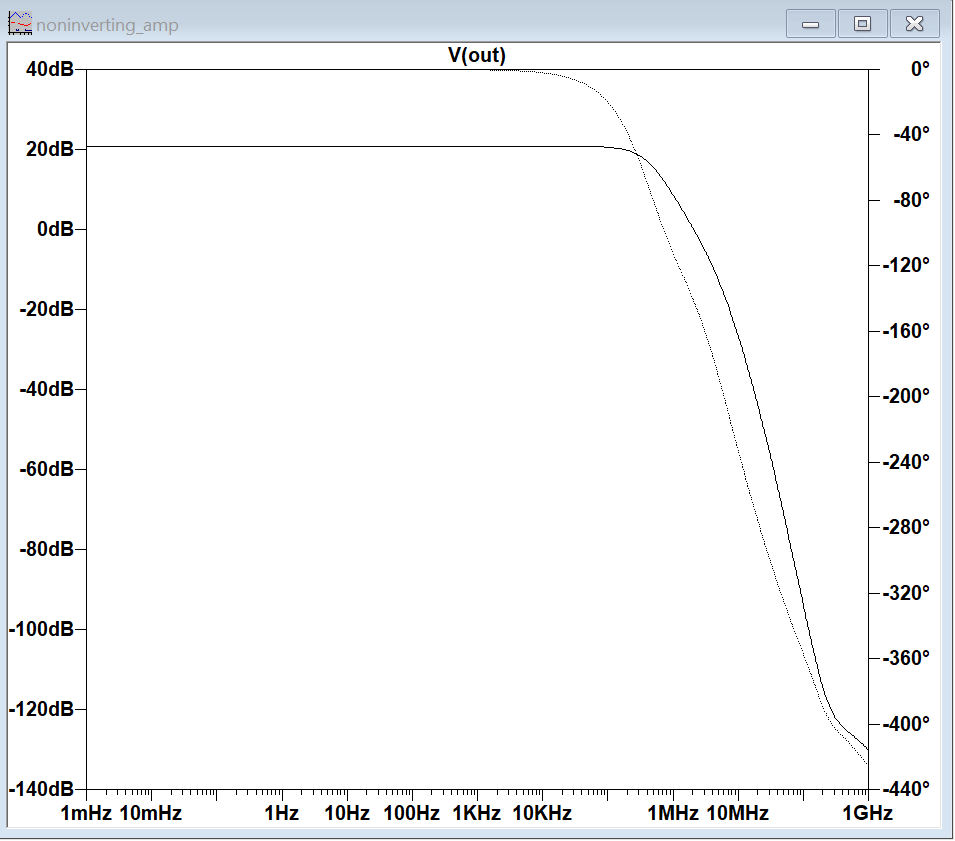
**Operating point:**

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**Transient:**

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**AC analysis:**

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**Result:**