

# Circuit Simulation Project

<https://esim.fossee.in/circuit-simulation-project>

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**Title of the circuit :** VOLTAGE SHUNT FEEDBACK AMPLIFIER

## Theory/Description :

**Voltage Shunt Feedback Systems**, also known as shunt-shunt feedback system operates as a current-voltage controlled feedback system. In the shunt-shunt feedback configuration the signal fed back is in parallel with the input signal. The output voltage is sensed and the current is subtracted from the input current in shunt, and as such its the currents, not the voltages that subtract.

For the shunt-shunt connection, the configuration is defined as the output voltage,  $V_{out}$  to the input current,  $I_{in}$ . As the output voltage is fed back as a current to a current-driven input port, the shunt connections at both the input and output terminals reduce the input and output impedance. therefore the system works best as a trans resistance system with the ideal input resistance,  $R_{in}$  being very small, and the ideal output resistance,  $R_{out}$  also being very small.

Then the shunt voltage configuration works as trans resistance type voltage amplifier as the input signal is a current and the output signal is a voltage, so the transfer gain is given as:  $R_m = V_{out} / I_{in}$ .

## Circuit Diagram(s) :

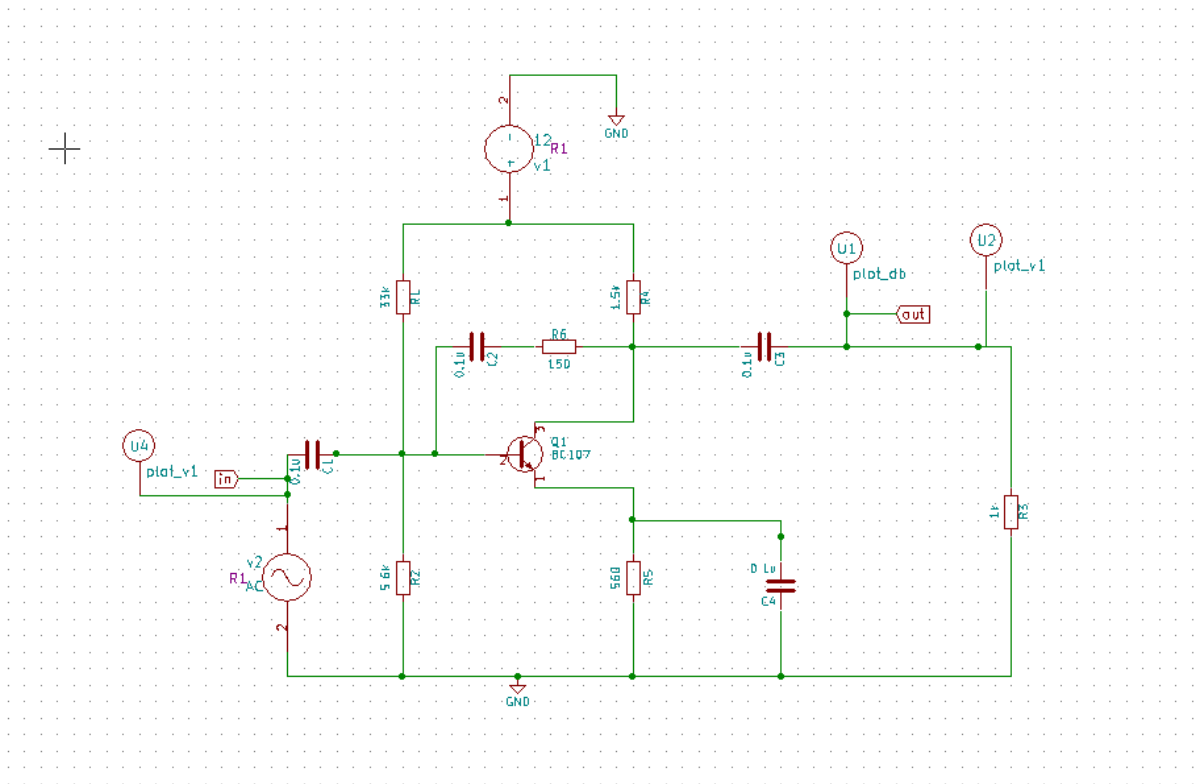


Figure 1: Schematic diagram of voltage shunt feedback amplifier

**Results (Input, Output waveforms and/or Multimeter readings):**

**NgSpice Plots:**

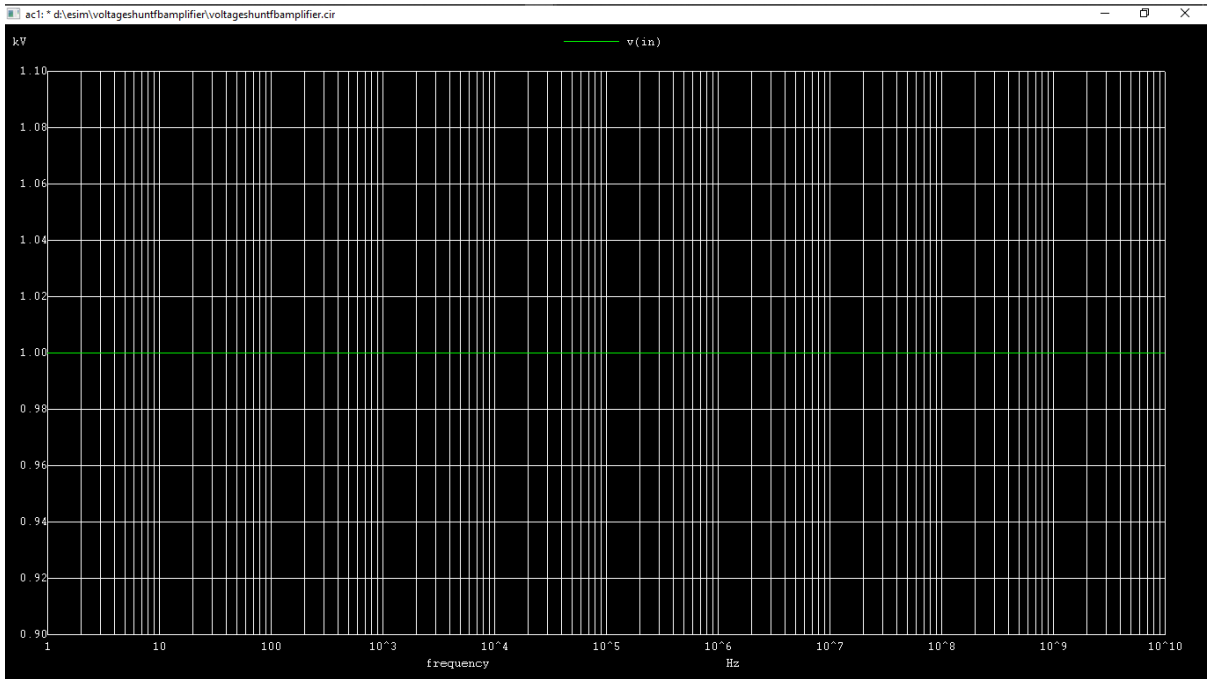


Figure 2: ngspice input 1 plot

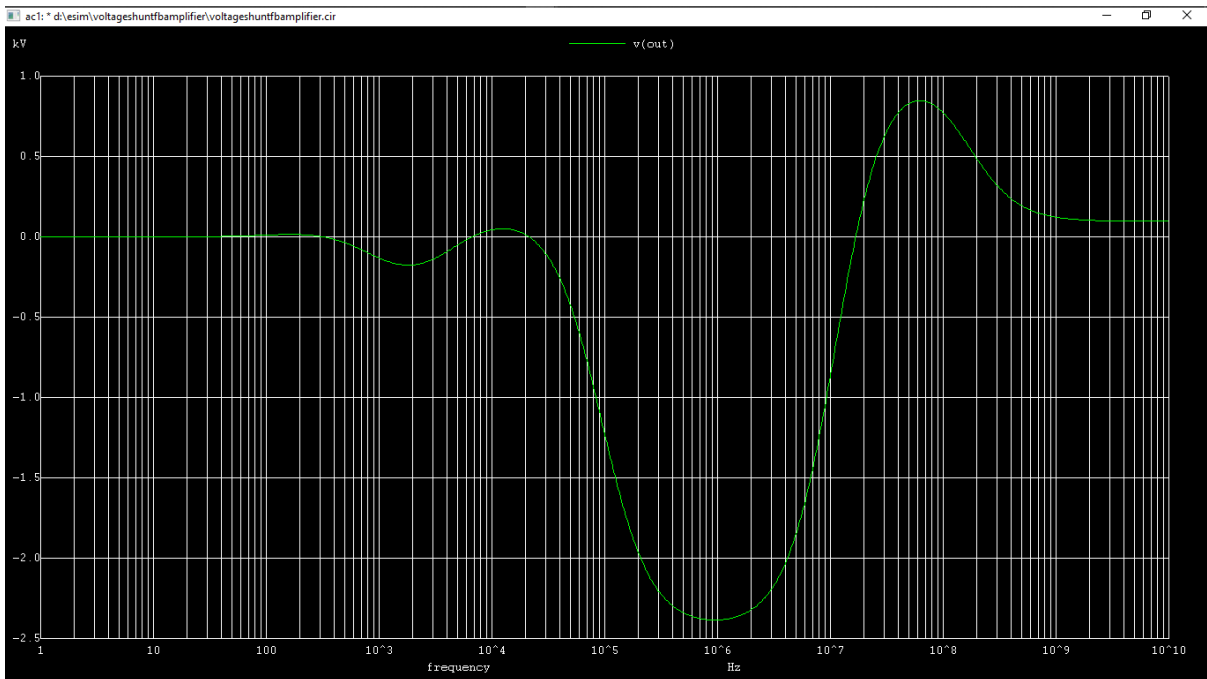


Figure 3: ngspice voltage output plot

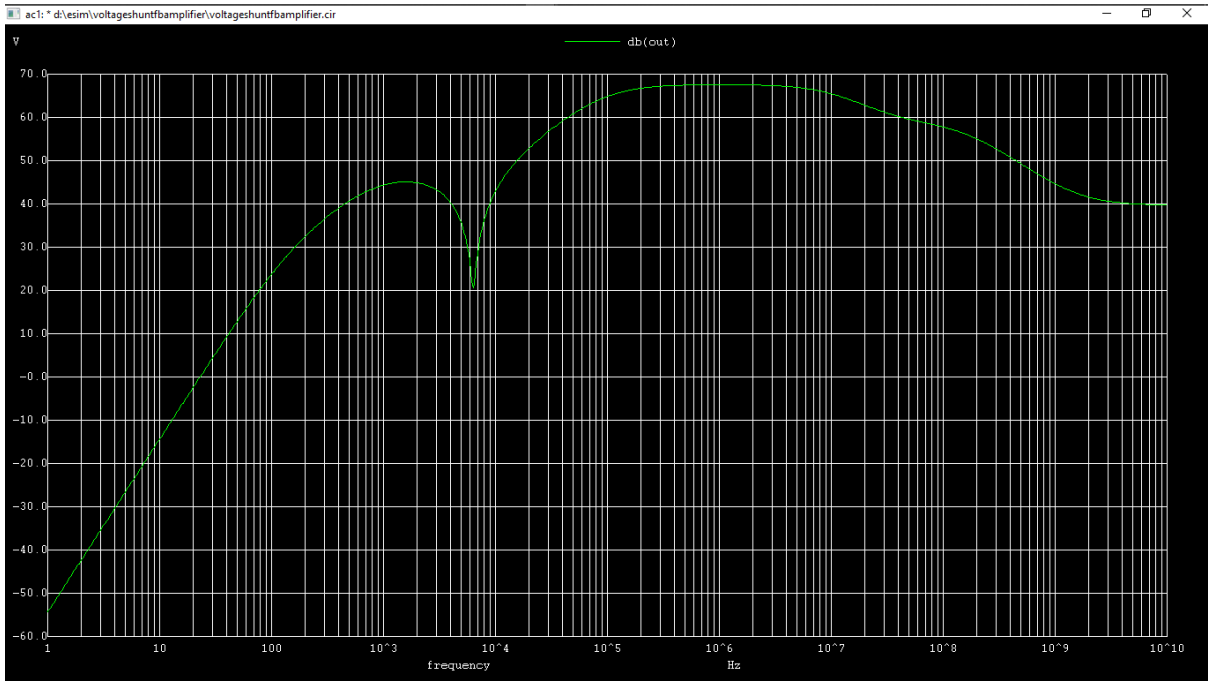


Figure 4: NgSpice voltage gain output plot

PYTHON PLOT:

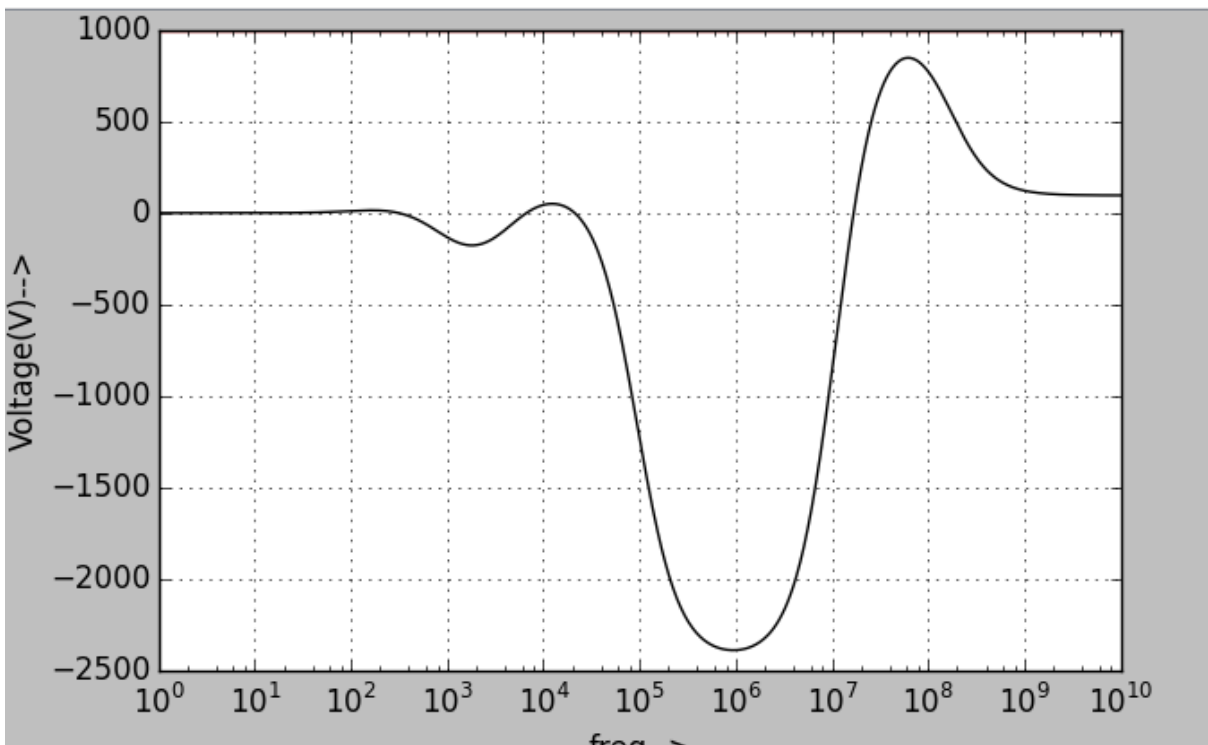


FIGURE 5: FREQUENCY PLOT

**Source/Reference(s) :**

<https://www.electronics-tutorials.ws/systems/feedback-systems.html>