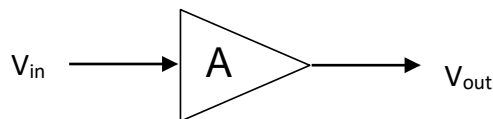


WEST VIRGINIA UNIVERSITY
College of Engineering and Mineral Resources
Lane Department of Computer Science and Electrical Engineering
Analog Electronics Lab

Lab 1 – LTspice & Introduction to Amplifier
 (Simulation Only)

Part I:

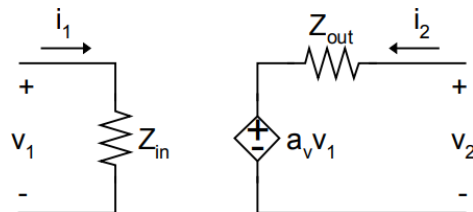
Using LTspice simulation software, build an amplifier with input sine wave with peak amplitude of 10 mV & frequency of 1000 Hz. The output signal should have a peak amplitude of 1 V.



1. Calculate the gain of the amplifier above.
2. Use LTspice to build the circuit and plot
 - (i) input vs time
 - (ii) output vs time

Hint:

- Two-Port Model:

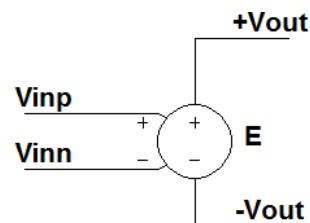


Where:

- $Z_{in} = \infty \Omega$
- $Z_{out} = 0 \Omega$
- You can use Voltage-Controlled Voltage source as your amplifier.

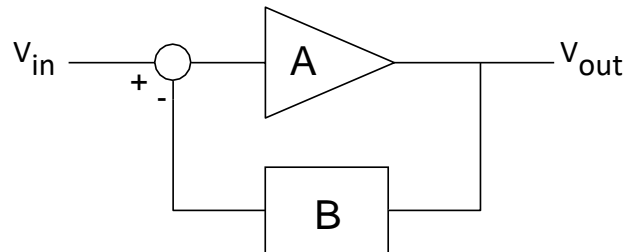
where:

 - E is the gain factor of the voltage-controlled voltage source.
 - V_{inp} : non-inverting input of the amplifier
 - V_{inn} : inverting input of the amplifier



Part II

Now, design a negative feedback amplifier to achieve an overall amplification of 200. The operational amplifier gain (A) should be 10,000.



1. What is the feedback value B to achieve the desired gain of 200?
2. Design the negative feedback configuration you could use to obtain required gain?
3. Using same input signal from Part I, build the circuit in LTspice and plot
 - (i) Input vs time
 - (ii) Output vs time
 - (iii) Verify that the gain of the circuit is 200
4. Plot the feedback signal vs time, and explain what you observe?