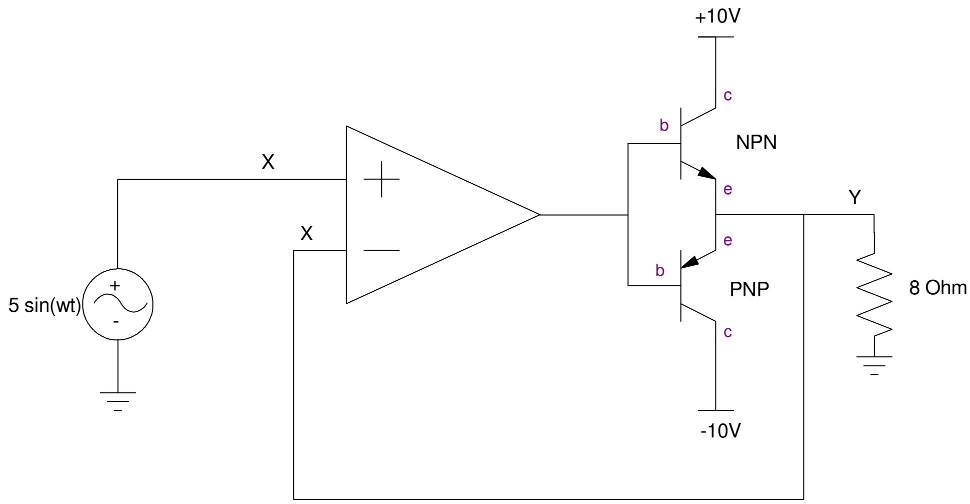


The result from CircuitLab is

CircuitLab Simulation: Note that Y = X (i.e. the cross-over distortion is removed).

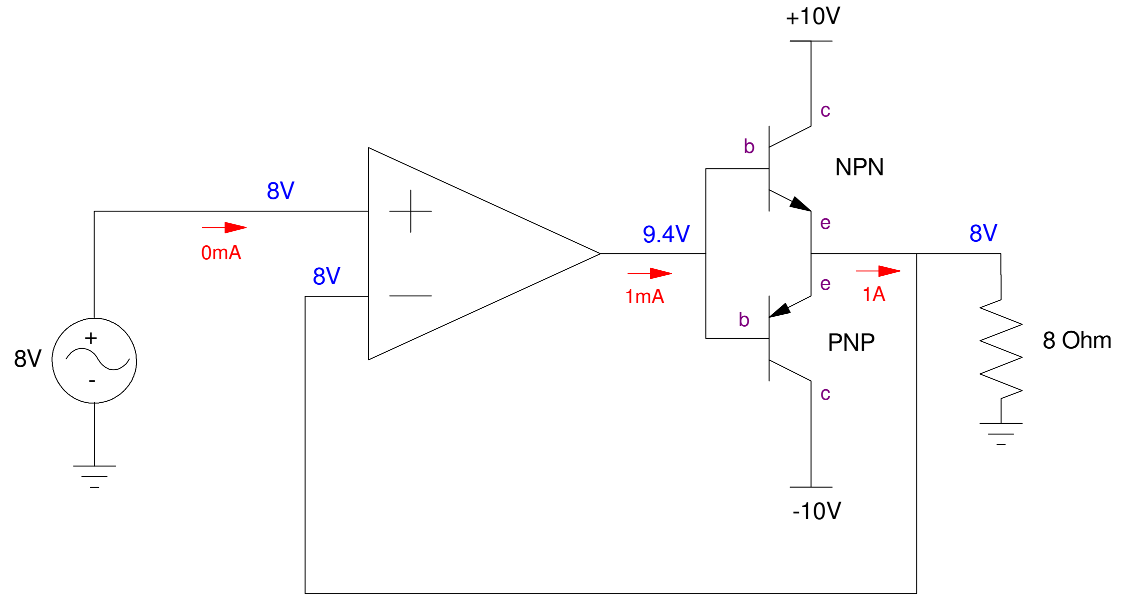
While this may seem silly (all this for a gain of one), there is an amplification in current (and power). Assume to get numbers that

$$X = 8.00V$$

The currents are then

- I3 = 1.00A (8V @ 8 Ohms)
- I2 = 1.00 mA (β = 1000)
- I1 = 0.00 mA (ideal op amp)

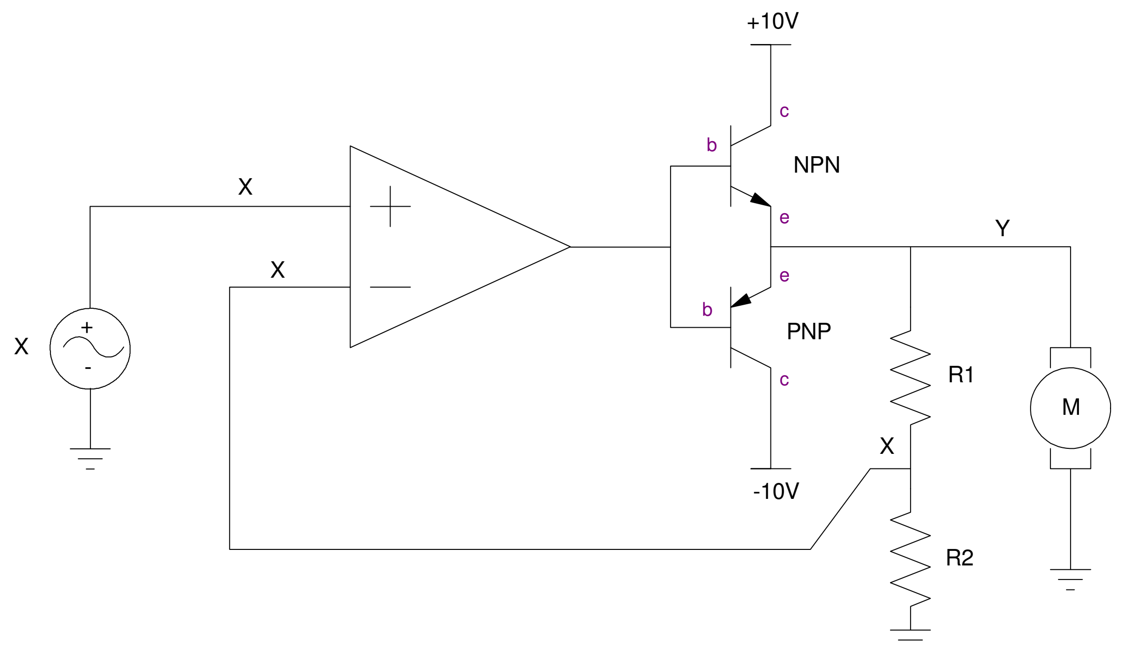
This circuit acts as a buffer: it takes a +/- 10V analog signal which is not capable of much current and drives an 8 Ohm speaker at up to 1A (limited by the 10V power supply).



Push-Pull Amplifier: Voltage Output

For DC motors, voltage is speed (approximately). If you add a voltage divider at the output, you can get voltage amplification:

$$Y = \left(1 + \frac{R_1}{R_2}\right) X$$



Push-Pull Amplfier: Current Output

For DC motors, current is torque. For LED's, current is brightness. The following circuit sets

$$I_m = \frac{X}{1\Omega}$$

so 1V in means 1A at the motor.