Experiment 9 Pre-Lab Xiangbo Cai
ECE203 Spring 2025

In the lab, we will need to build a transistor amplifier to drive the speaker instead of the 741 op-amp. We will assemble this for you, but you need to know why we are building it.

1. (2 points) Assuming the 741 op-amp can supply up to 12mA without additional cooling, and the speaker is an 8Ω load, calculate the maximum power the 741 can provide to the speaker.

$P = I^2R = (0.012)^2 \times 8 = 1.152mW$

2. (2 points) The transistor circuit we're going to use is rated for 1A. Calculate the power that the transistor circuit can deliver to the 8Ω speaker.

$P = I^2R = 1^2 \cdot 8 = 8W$

3. (2 points) Why don't we just connect the 741 to the speaker directly?

Because this will cause too much current run through

4. (2 points) We want to build a filter that isolates all frequencies below 200Hz *so that they can be amplified*. Should this be a low-pass filter or high-pass filter?

Low pass filter. Becaus low pass filter.

Can make $f \geq 200Hz$ Not go through

5. (2 points) Superposition only applies to linear circuits. Op-amps are nonlinear because the output voltage cannot exceed the supply voltages. Given this information, why is it that we can use superposition to analyze the op-amp summing circuit?

Because in the op-amp working area. It is linear.

Therefore we can use Superposition to analysis