

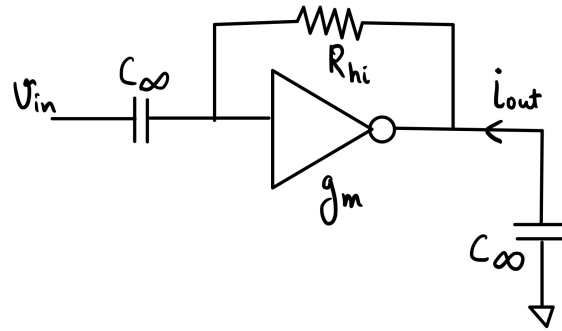
# ANALOG LAB 2021

## EE2401

### Experiment 2: $g_m$ -C filter

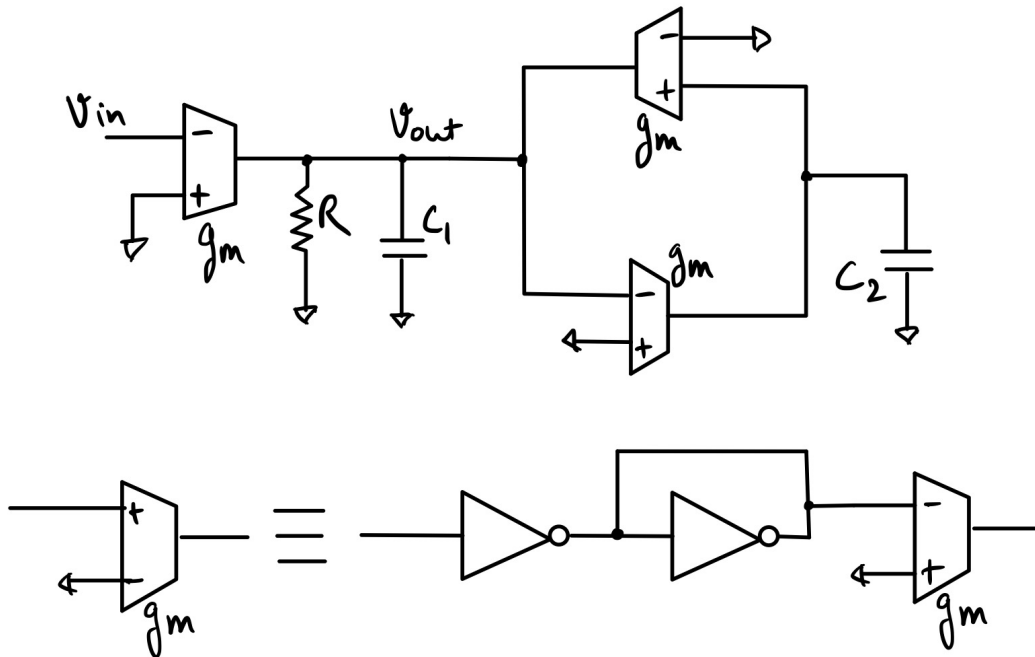
---

1. Calculate the value of  $R_{hi}$  required to make  $\frac{i_{out}}{v_{in}} = 0.99 g_m$ , where  $g_m$  is the transconductance of inverter.



2. Design a  $g_m$ -C filter using only inverters and capacitors with the following specifications:

- Resonant frequency: 10 kHz
- Supply voltage: 6 V
- Quality factor: 2



Use only transient and DC simulations to characterize the filter.

3. Now tune the above designed filter by varying the supply voltage from 5 V to 9 V. What do you observe in the filter response as the supply voltage changes?

**CAD info:**

- Use model of the inverter provided in Experiment 1.
- CD4069 <https://www.ti.com/product/CD4069UB>
- PSPICE models can be used in LTspice using this procedure: <https://www.analog.com/en/technical-articles/ltspice-simple-steps-to-import-third-party-models.html>

**Submit the following:**

- Testbench snapshot, output plots
- Hand calculation
- Any unusual observation along-with comments