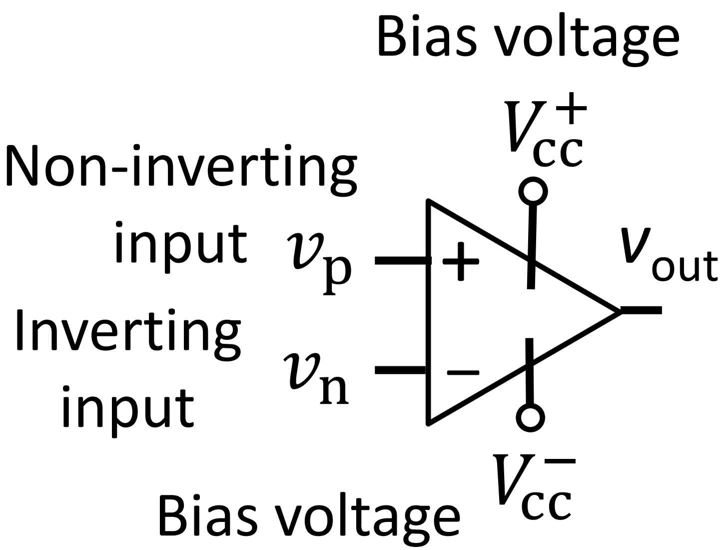
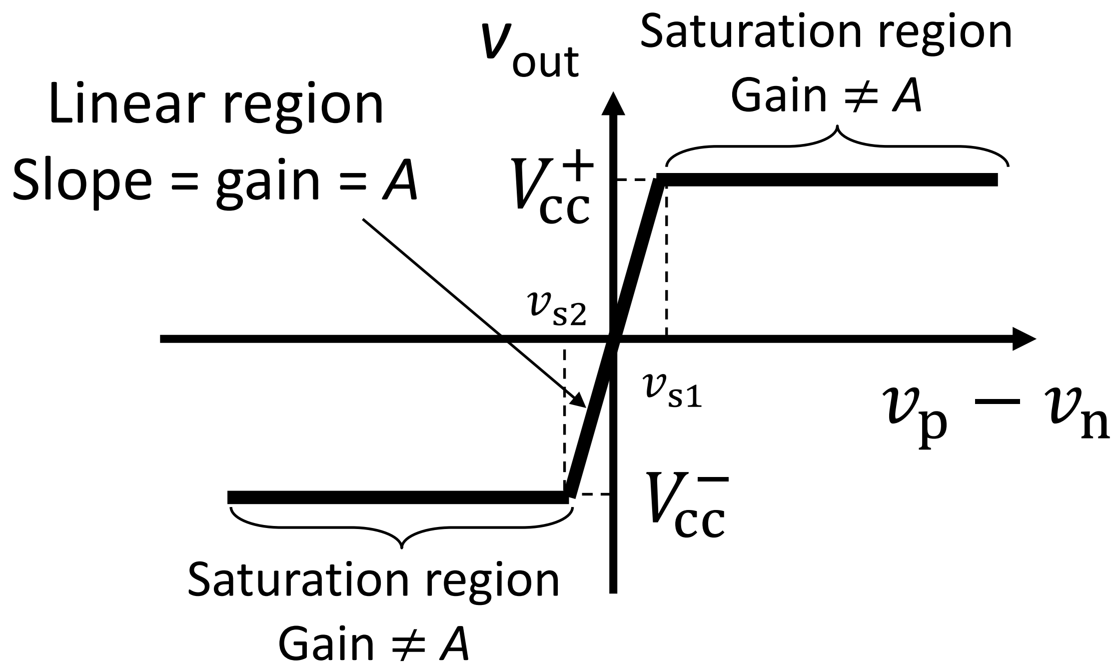
Gain model of an ideal opamp



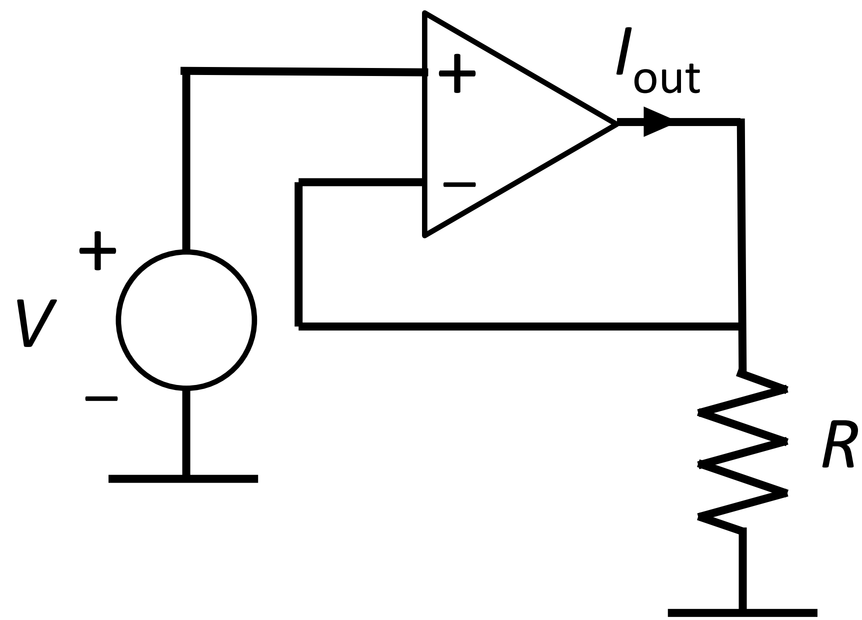


$$v_{out} = \begin{cases} V_{cc}^{+}, & v_{s1} < (v_p - v_n) \\ (v_p - v_n)A, & v_{s2} < (v_p - v_n) < v_{s1} \\ V_{cc}^{-}, & (v_p - v_n) < v_{s2} \end{cases}$$

Practically,
$|v_{s1}|, |v_{s2}| \sim \mathrm{mV}$,
while $V_{cc}^{+}, V_{cc}^{-} \sim \mathrm{V}$

Quiz 8

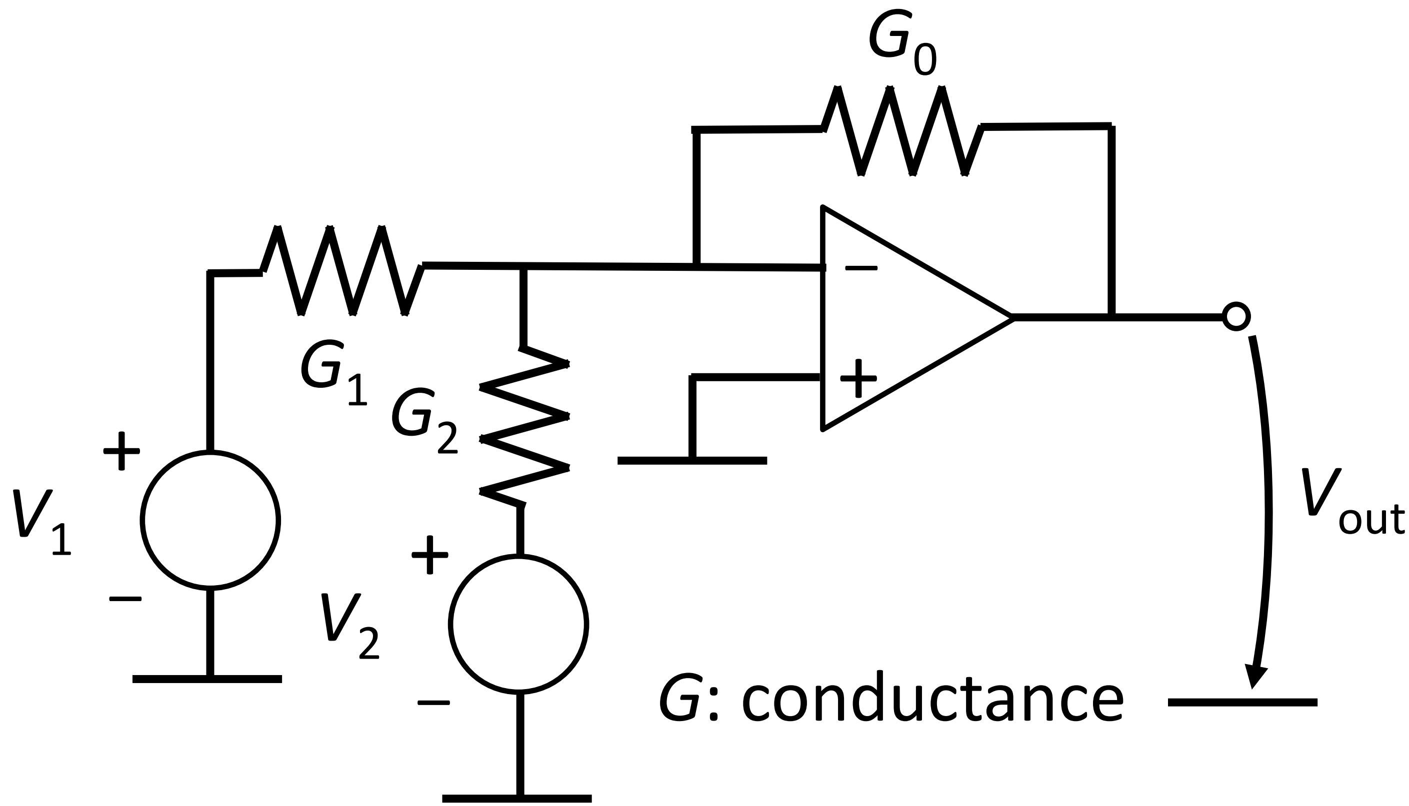
- Assume an ideal opamp. Derive the current I_{out}. [If bias voltage is not mentioned in the circuit, we can think $V_{\mathrm{cc}}^{+} = \infty\ \mathrm{V}$ and $V_{\mathrm{cc}}^{-} = -\infty\ \mathrm{V}$]



$$V = 1\ \mathrm{V}$$
$$R = 1\ \mathrm{k\Omega}$$

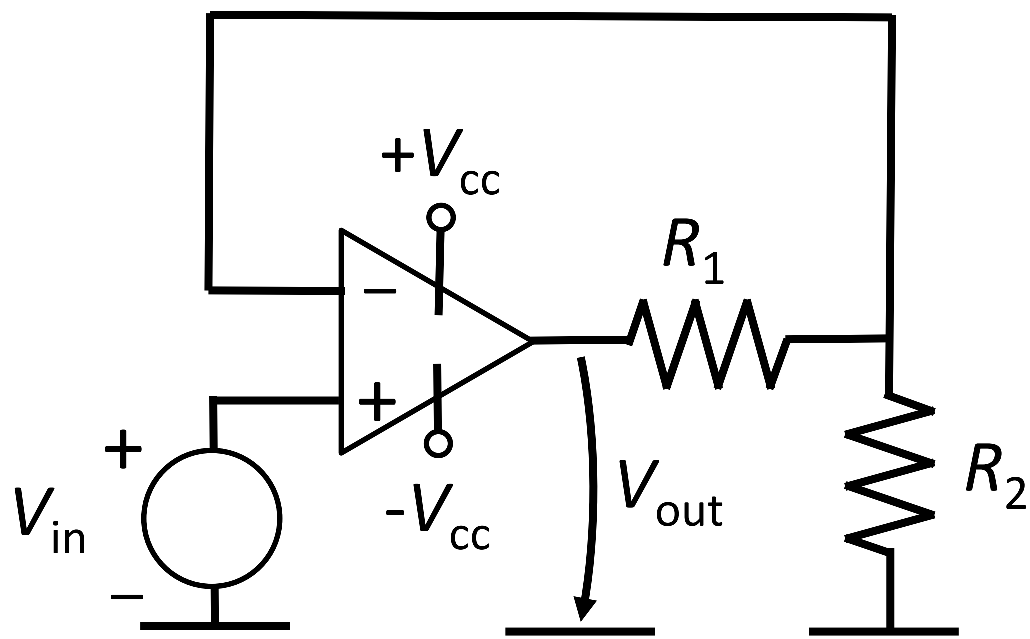
Quiz 9

- Assume an ideal opamp. Express voltage V_{out} using V_1 and V_2. What does this circuit do for V_1 and V_2?



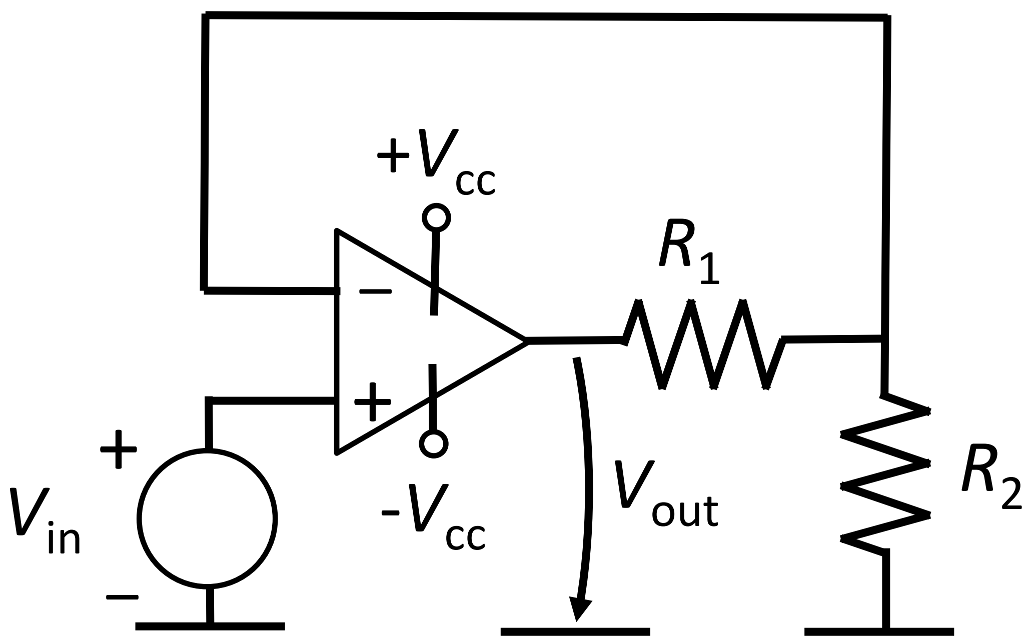
Quiz 10-1

- Is this a non-inverting or inverting amplifier? Check by expressing V_{out} using V_{in}.



Quiz 10-2

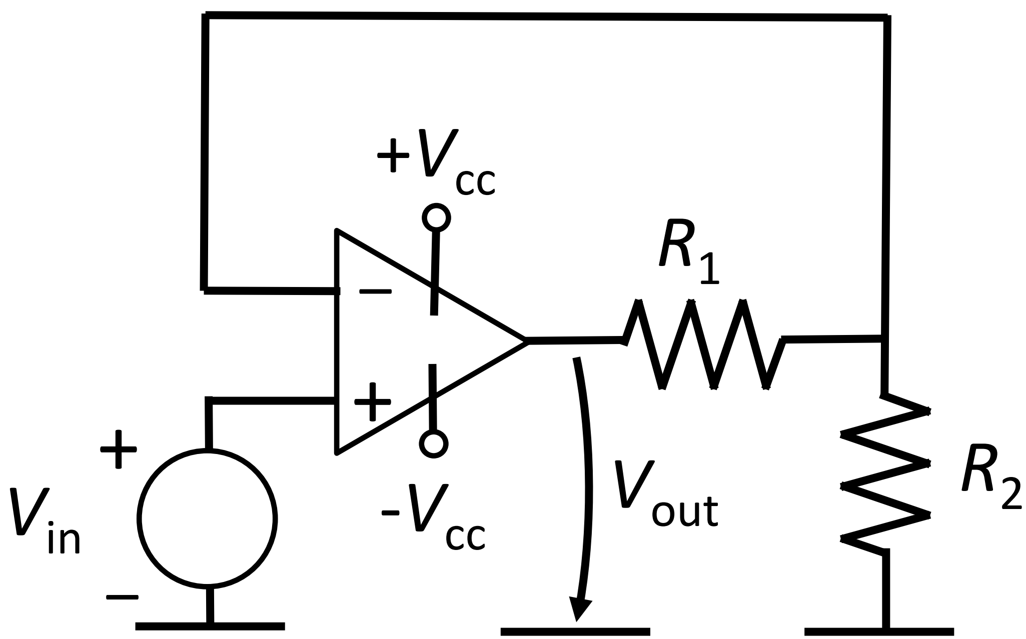
- Calculate V_{out}. Is the opamp in linear or saturation mode?



$$V_{\mathrm{in}} = 1\ \mathrm{V}$$
$$R_1 = 1\ \mathrm{k\Omega}$$
$$R_2 = 1\ \mathrm{k\Omega}$$
$$V_{\mathrm{cc}} = 12\ \mathrm{V}$$

Quiz 10-3

- Calculate V_{out}. Is the opamp in linear or saturation mode?



$$V_{\text{in}} = -7\text{ V}$$
$$R_1 = 1\text{ k}\Omega$$
$$R_2 = 1\text{ k}\Omega$$
$$V_{\text{cc}} = 12\text{ V}$$