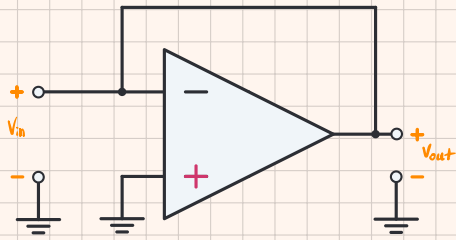


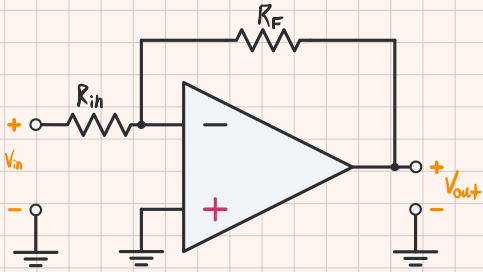
Voltage Follower (Buffer)



$$A_v = \frac{V_{out}}{V_{in}} = 1$$

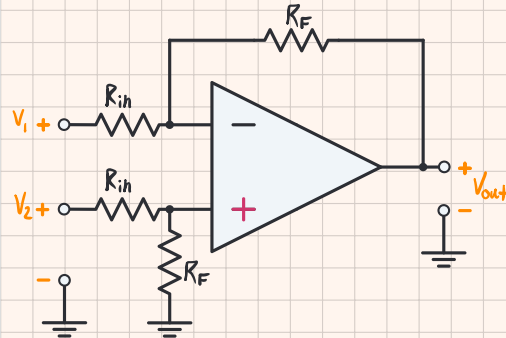
Common Op-Amp Configurations

Inverting Amplifier



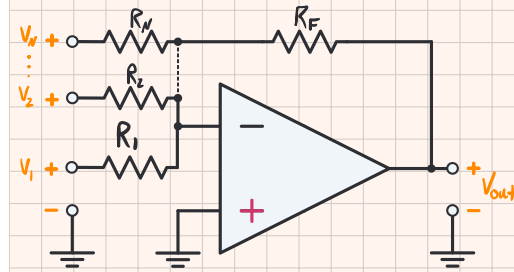
$$A_v = \frac{V_{out}}{V_{in}} = -\frac{R_F}{R_{in}}$$

Differential Amplifier



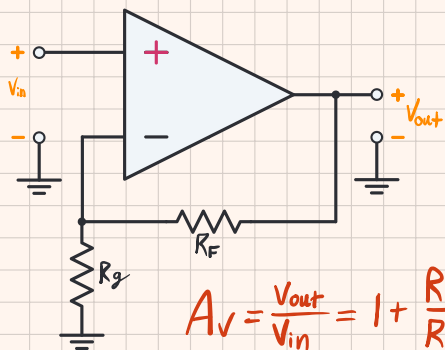
$$V_{out} = \frac{R_F}{R_{in}} (V_2 - V_1)$$

Summing Amplifier



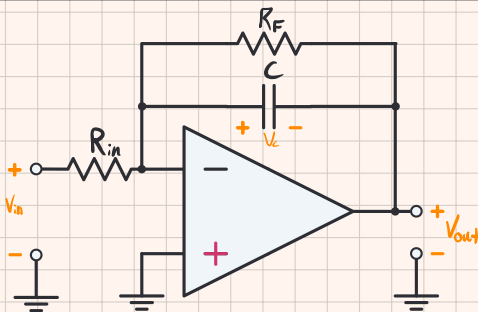
$$V_{out} = -R_F \left(\frac{V_1}{R_1} + \frac{V_2}{R_2} + \dots + \frac{V_N}{R_N} \right)$$

Non-Inverting Amplifier



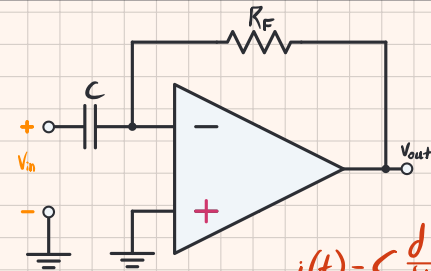
$$A_v = \frac{V_{out}}{V_{in}} = 1 + \frac{R_F}{R_g}$$

Inverting Integrator



$$\frac{V_{out}(s)}{V_{in}(s)} = -\frac{R_F}{R_{in}} \frac{1}{1 + sCR_F}$$

Inverting Differentiator



$$i(t) = C \frac{d}{dt} v_{in}(t)$$

$$V_{in}(t) = -CR \frac{d}{dt} v_{in}(t)$$

$$\frac{V_{out}(s)}{V_{in}(s)} = -sCR$$