Inverter configuration

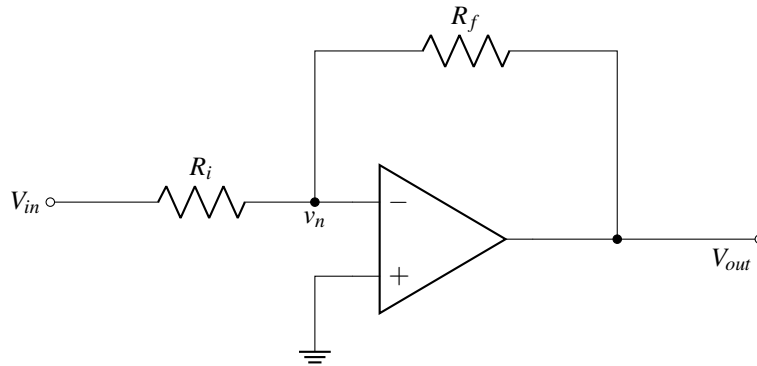Mario Sepúlveda-Hernández

February 6, 2025

Figure 1: Operational Amplifier (inverter configuration)

The Figure 1 represents the inverter configuration with an operational amplifier; the input signal V_{in} will be inverted at the output V_{out}

$$i_i = i_{in} + i_f$$
$$Z_i \longrightarrow \infty \implies i_{in} = 0$$
$$i_i = i_f$$
$$i_i = \frac{V_{in} - \cancelto{0}{v_n}}{R_i} = \frac{V_{in}}{R_i}$$
$$i_f = \frac{\cancelto{0}{v_n} - V_{out}}{R_f} = -\frac{V_{out}}{R_f}$$
$$\implies \frac{V_{in}}{R_i} = -\frac{V_{out}}{R_f}$$
$$\implies \frac{V_{out}}{V_{in}} = -\frac{R_f}{R_i} = A_v$$