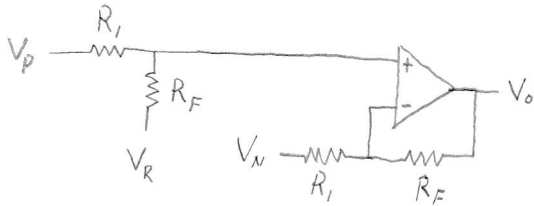


DIFFERENCE AMPLIFIER WITH OFFSET



LET $V_p = V_n = 0V$ i.e. GND

THEN V_{OR}

$$V_{OR} = V_R \frac{R_i}{R_i + R_F} \cdot \frac{R_i + R_F}{R_i}$$

$$V_{OR} = V_R$$

LET $V_R = V_n = 0V$ i.e. GND

THEN V_{OP}

$$V_{OP} = V_p \frac{R_F}{R_i + R_F} \cdot \frac{R_i + R_F}{R_i}$$

$$V_{OP} = \frac{R_F}{R_i} V_p$$

LET $V_R = V_p = 0V$ i.e. GND

THEN V_{ON}

$$V_{ON} = -\frac{R_F}{R_i} V_n$$

THEN VIA SUPERPOSITION

$$V_o = V_{OP} + V_{ON} + V_{OR}$$

$$V_o = \frac{R_F}{R_i} V_p + \left(-\frac{R_F}{R_i} V_n\right) + V_R$$

$$V_o = \frac{R_F}{R_i} V_p - \frac{R_F}{R_i} V_n + V_R$$

$$V_o = \frac{R_F}{R_i} (V_p - V_n) + V_R$$

$$V_o = \frac{R_F}{R_i} (V_p - V_n) + V_R$$

↑
OFFSET

← DIFF AMP →

THUS VALUE OF R_F AND R_i DOES NOT MATTER FOR

V_R . MAKING V_R THE

REFERENCE OF "SWING"

POINT OF THE AMPLIFIER

WITH GAIN = $\frac{R_F}{R_i}$ OF THE

DIFFERENCE OF $V_p - V_n$