



OP-AMP APPLICATIONS

DEPARTMENT : MECHANICAL ENGINEERING

ACADEMIC YEAR : 2023-24

YEAR/SEMESTER : SECOND /FOURTH

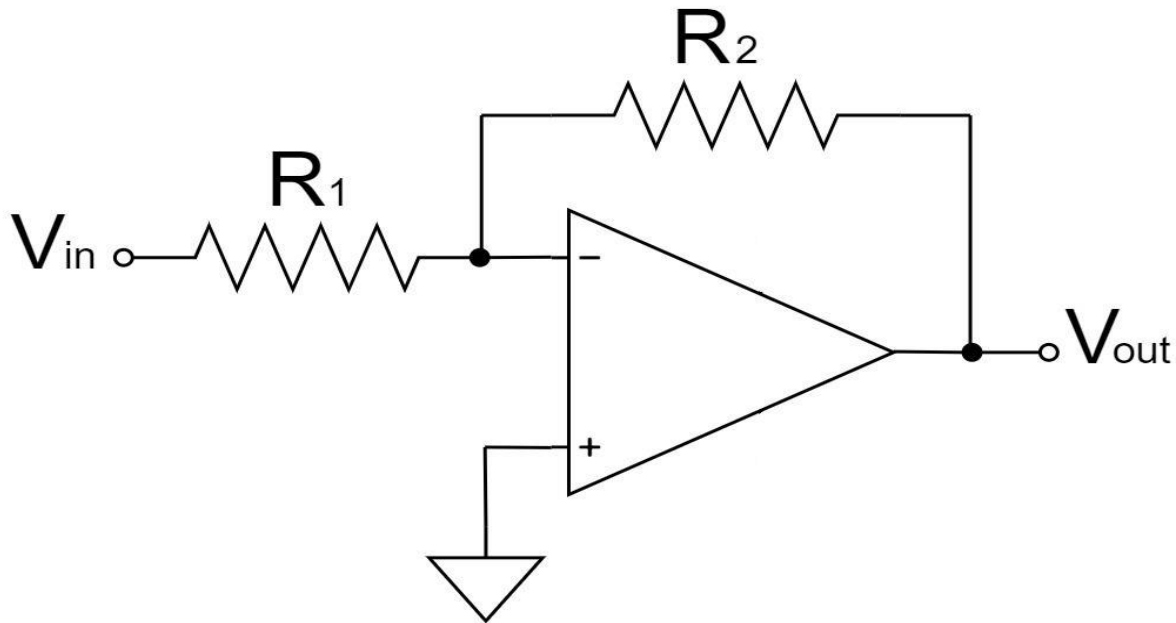
SUBJECT : INDUSTRIAL ELECTRONICS

CREATED BY : ER. REVATEE BAGADE

OP-AMP INVERTING AMPLIFIER

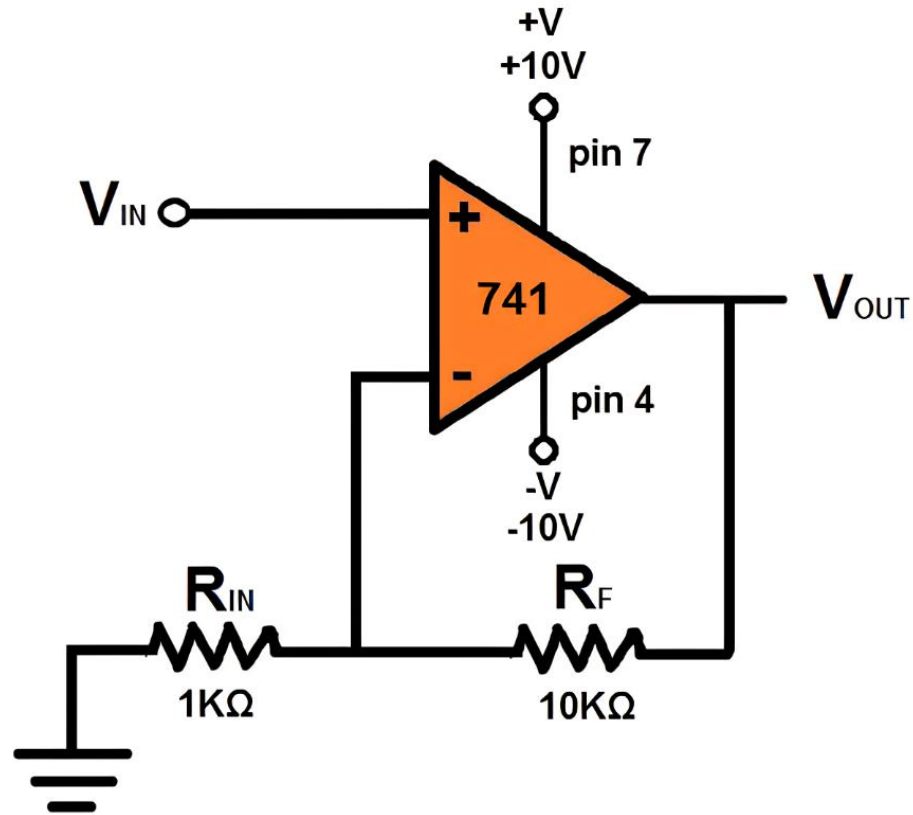
$$\text{Gain}(A_v) = (V_{\text{out}} / V_{\text{in}}) = -(R_f / R_{\text{in}})$$

Inverting Amplifier Circuit

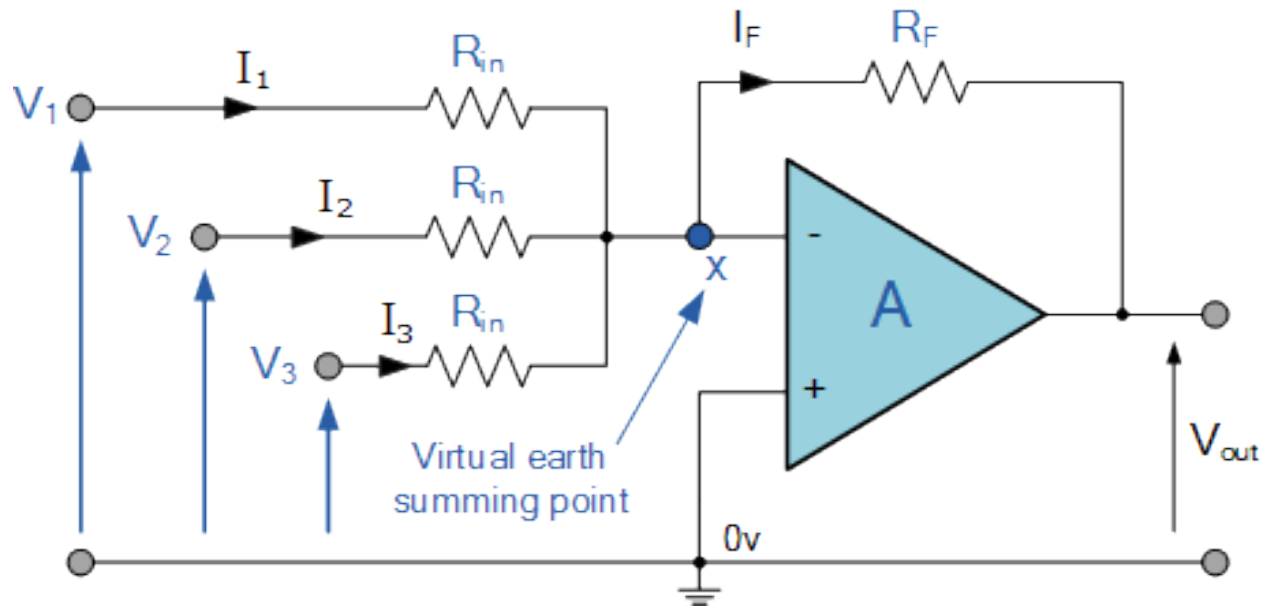


OP-AMP NON-INVERTING AMPLIFIER

$$A_v = V_{out}/V_{in} = 1 + (R_2/R_1).$$

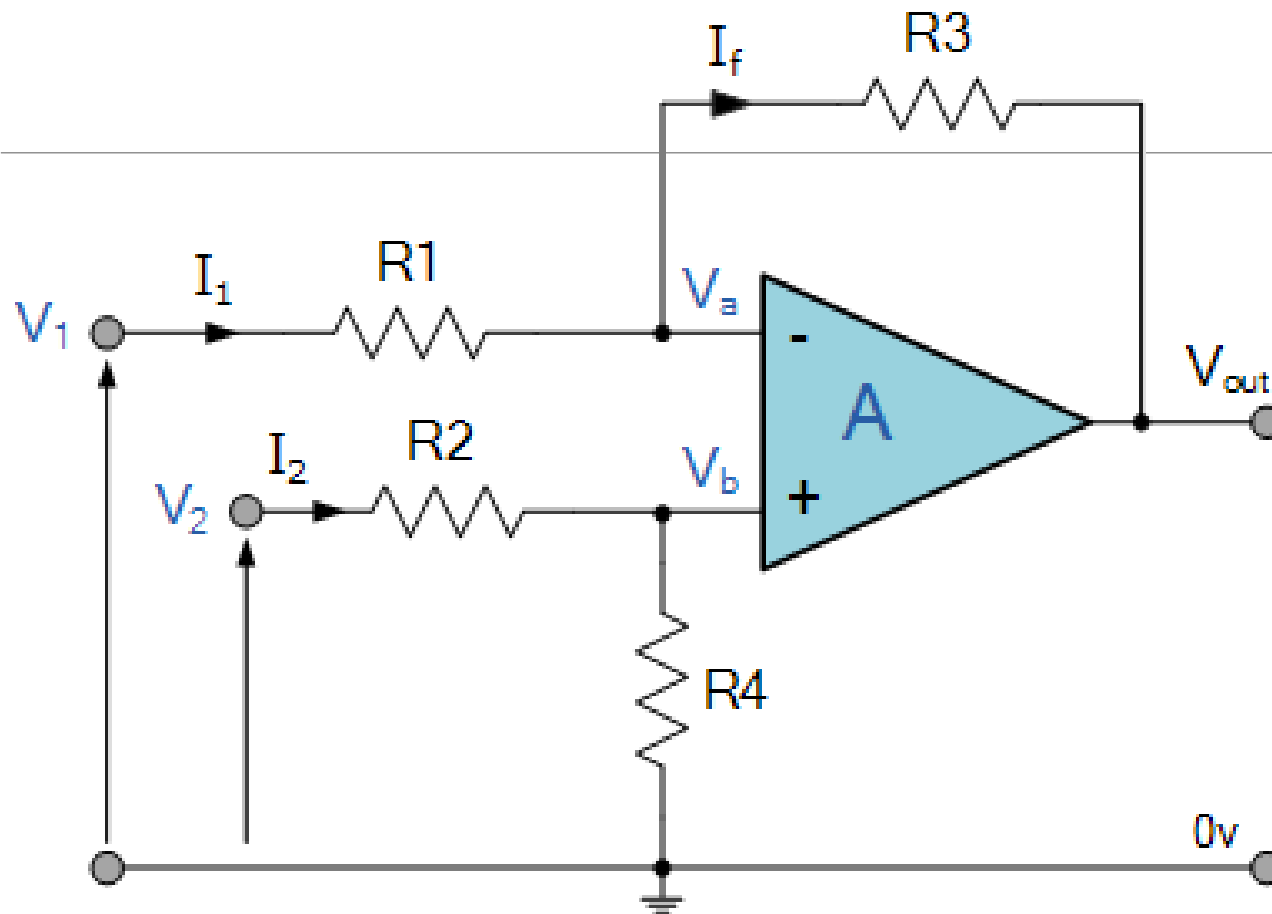


OP-AMP SUMMING AMPLIFIER



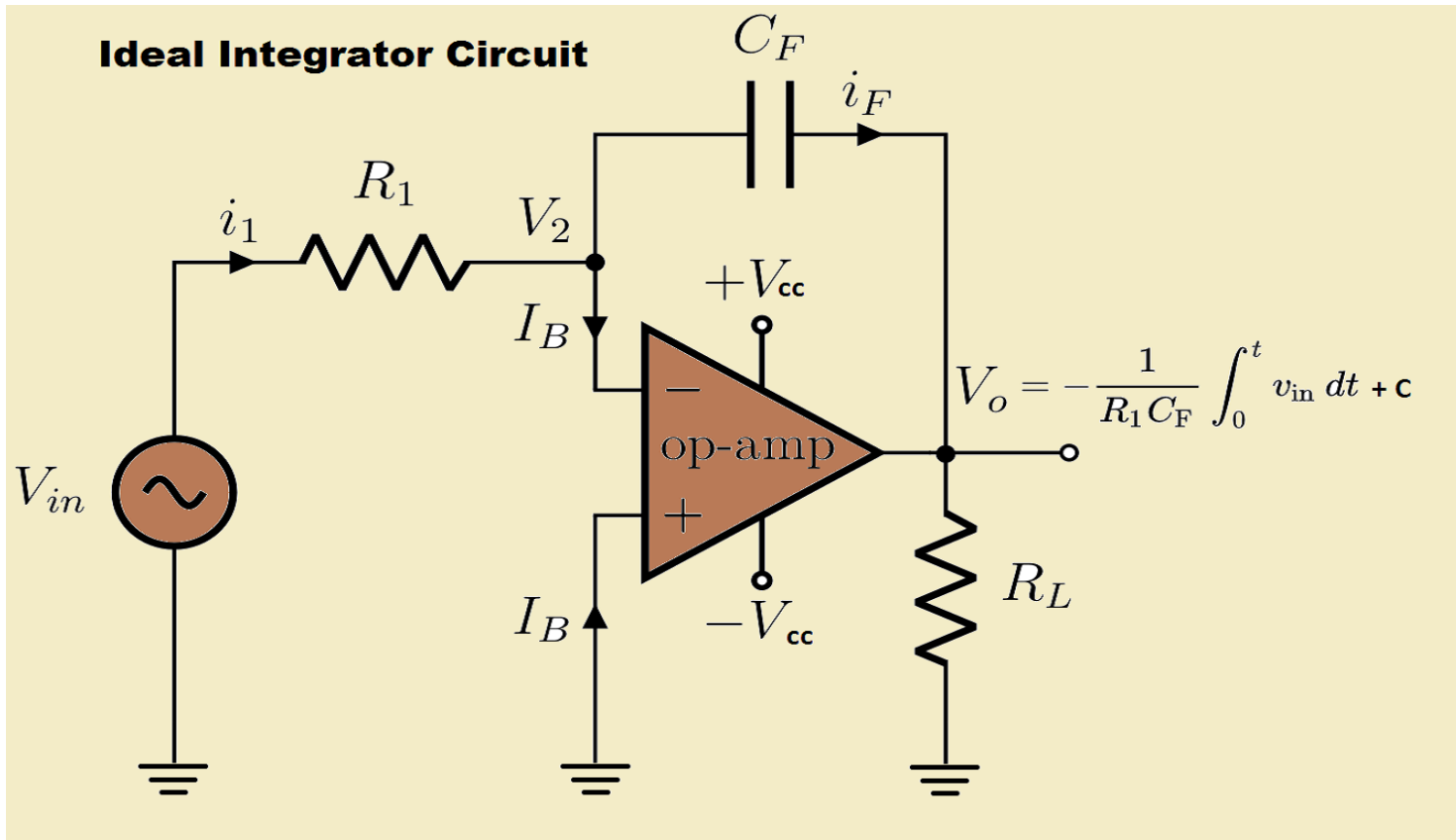
$$-V_{out} = \frac{R_F}{R_{IN}} (V_1 + V_2 + V_3 \dots \text{etc})$$

OP-AMP DIFFERENCE AMPLIFIER



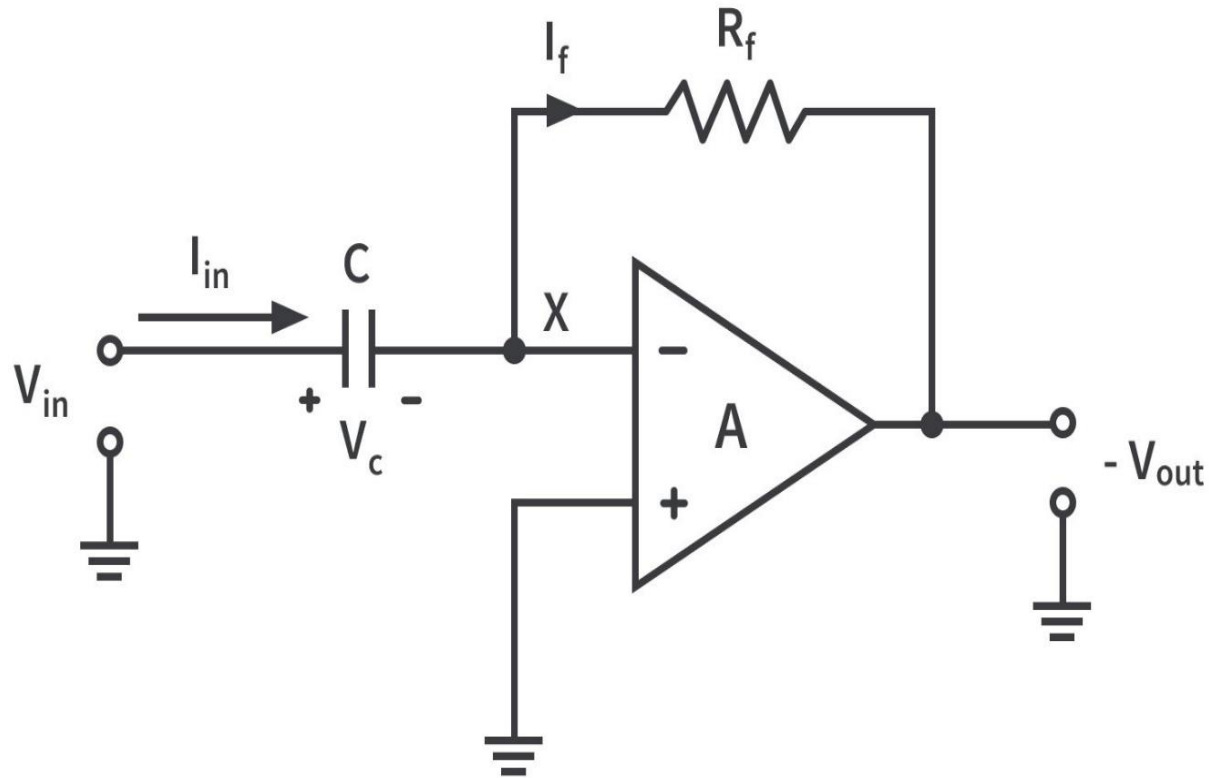
$$V_{OUT} = \frac{R_3}{R_1} (V_2 - V_1)$$

OP-AMP INTEGRATOR



$$V_{out} = -\frac{1}{R_{in} C} \int_0^t v_{in} dt = -\int_0^t v_{in} \frac{dt}{R_{in} \cdot C}$$

OP-AMP DIFFERENTIATOR



$$V_{OUT} = -R_F C \frac{dV_{IN}}{dt}$$