LECTURE 5 OP-AMP

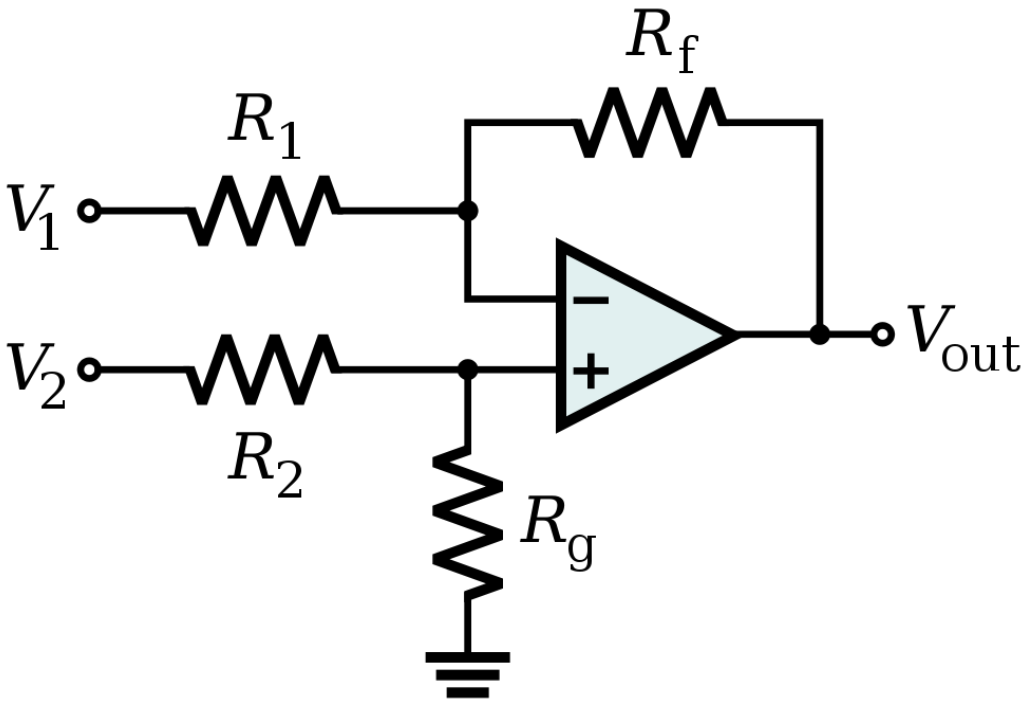
Operation Amplifier (Op-Amp) Applications

Difference Amplifier

Summing Amplifier

Instrumentation Amplifier

OP-AMP DIFFERENTIAL AMPLIFIER

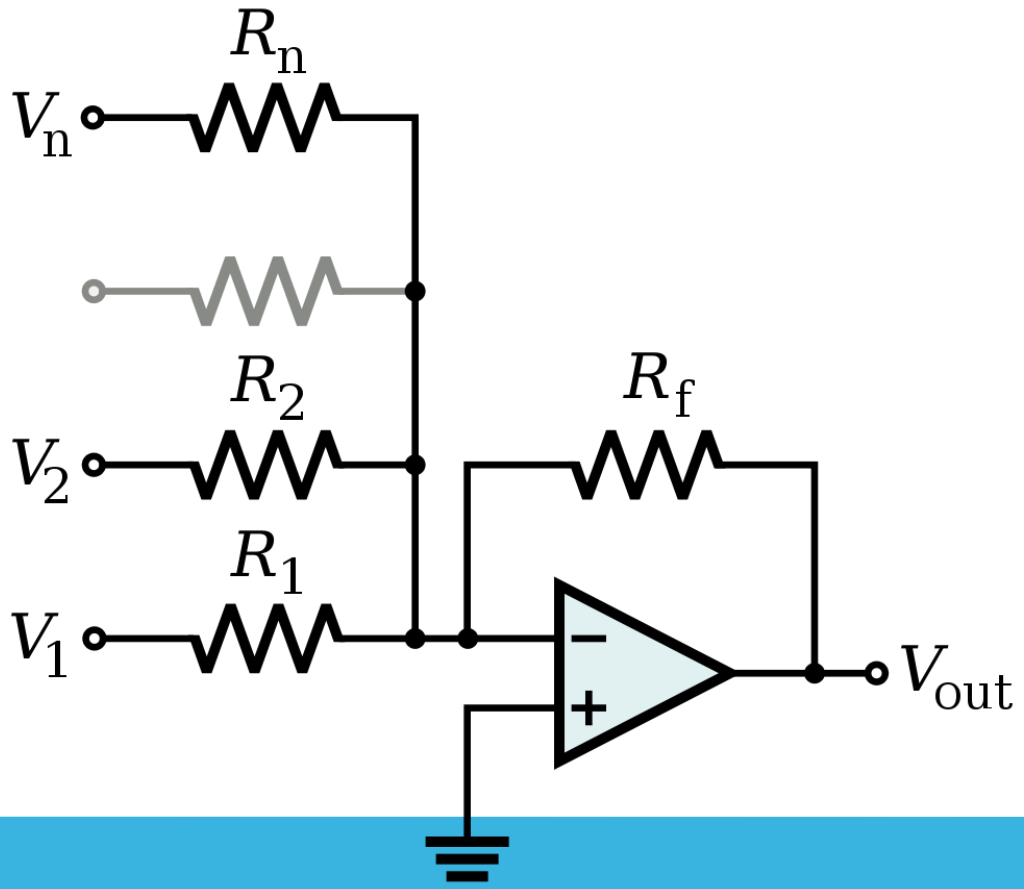


$$V_{out} = \frac{(R_f + R_1)\,R_g}{(R_g + R_2)\,R_1} V_2 - \frac{R_f}{R_1} V_1$$

If $R_1 = R_2$ and $R_f = R_g$:

$$V_{out} = \frac{R_f}{R_1}(V_2 - V_1)$$

OP-AMP SUMMING AMPLIFIER



$$V_{out} = -R_f \left(\frac{V_1}{R_1} + \frac{V_2}{R_2} + \cdots + \frac{V_n}{R_n} \right)$$

Instrumentation Amplifiers:

CMRR and Z_{in} are very important attributes of an IA

Can increase Z_{in} of difference amplifier configuration by adding buffers

Common mode signals are not amplified if common R_1 is used and connection to ground is removed.