



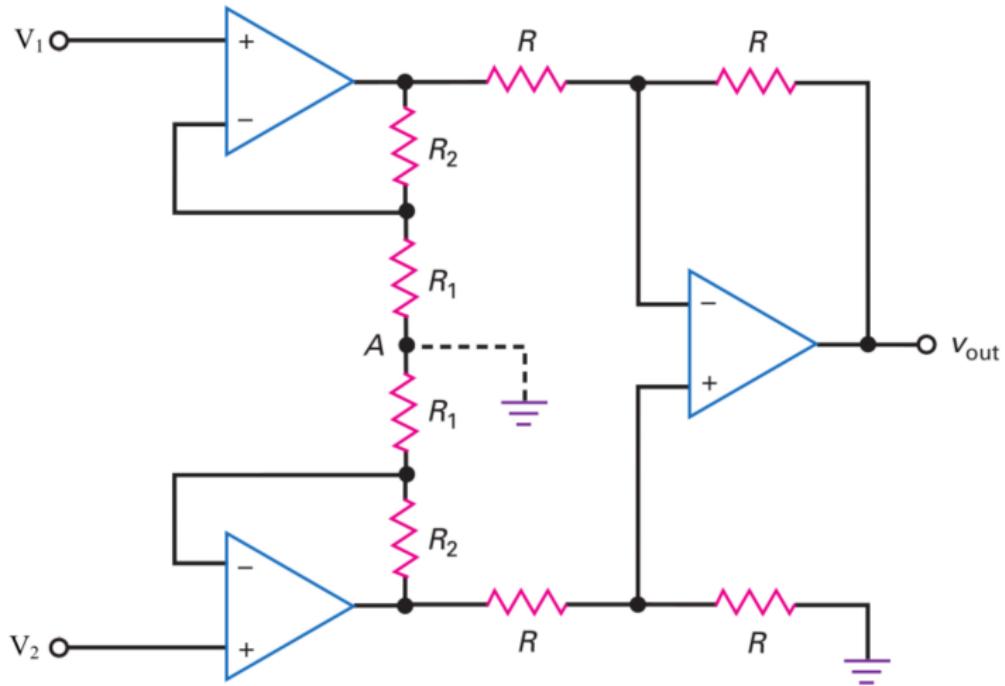
## Instrumentation Amplifier

Mifta Nur Farid

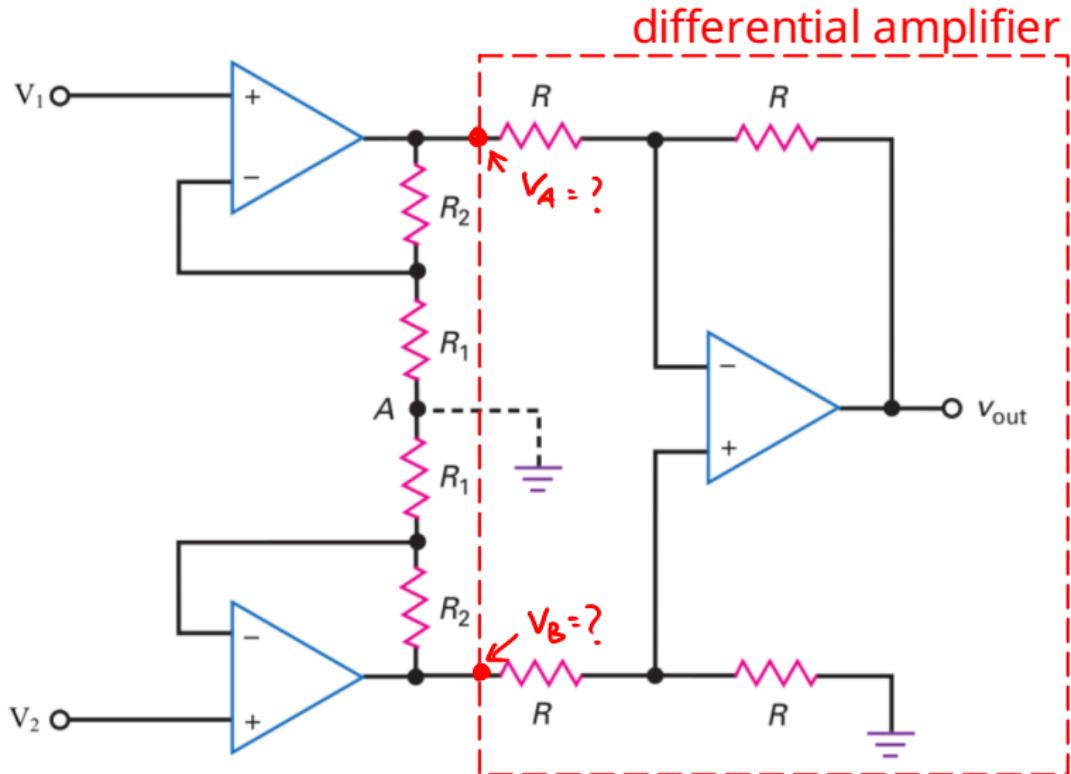
23 March 2023

# Electronic Circuit II

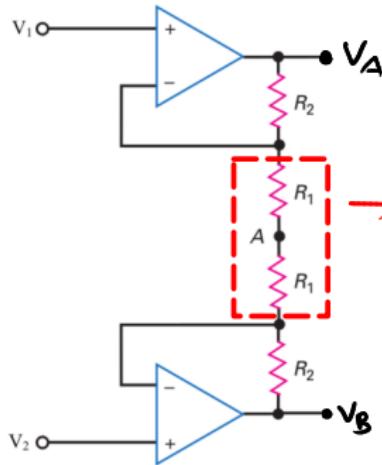
# Instrumentation Amplifier



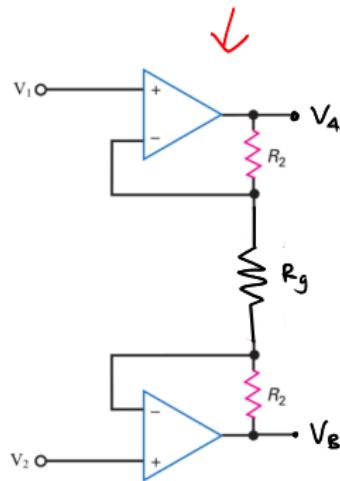
# Instrumentation Amplifier



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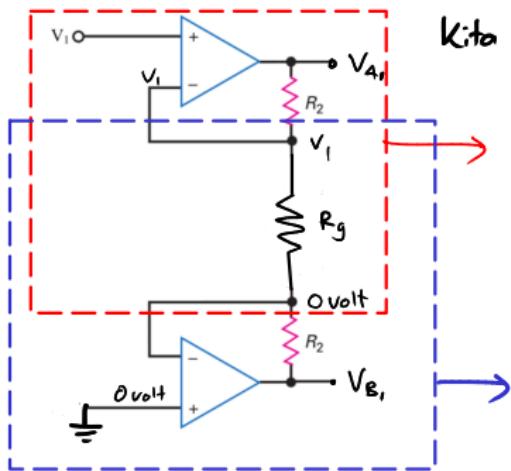


→ bisa kita sederhanakan (rangkaian seri)



selanjutnya lakukan analisis superposisi utk mendapatkan nilai Va dan Vb

# Instrumentation Amplifier



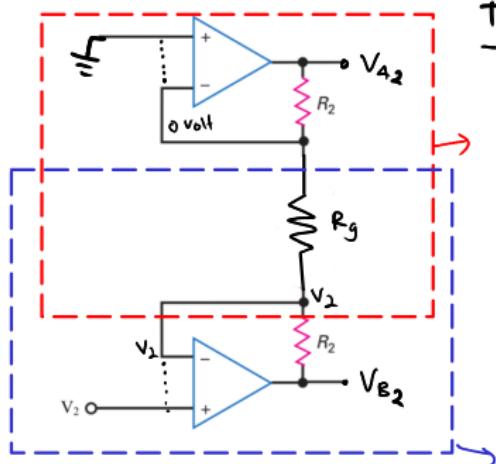
Rangkaian Non-inverting

$$V_{A_1} = \left( \frac{R_2}{R_g} + 1 \right) V_1$$

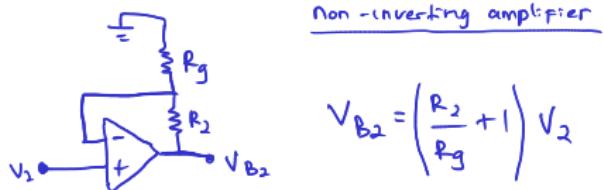
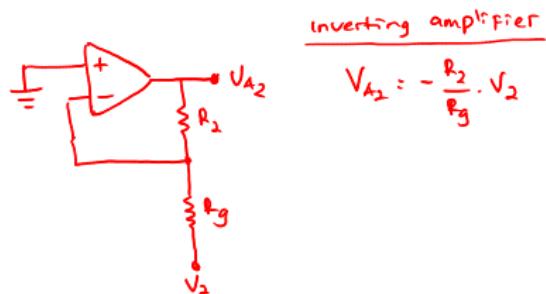
Rangkaian Inverting

$$V_{B_1} = - \frac{R_2}{R_g} \cdot V_1$$

# Instrumentation Amplifier



Tentukan  $V_{A2}$  dan  $V_{B2}$



# Instrumentation Amplifier

Sehingga:

$$V_A = V_{A_1} + V_{A_2} = \left( \frac{R_2}{R_g} + 1 \right) V_1 - \frac{R_2}{R_g} \cdot V_2$$

$$V_B = V_{B_1} + V_{B_2} = - \frac{R_2}{R_g} \cdot V_1 + \left( \frac{R_2}{R_g} + 1 \right) V_2$$

# Instrumentation Amplifier

Dengan menggunakan persamaan diff amp (materi sebelumnya), maka kita dapatkan Vout

$$\begin{aligned}
 V_{\text{out}} &= V_B - V_A = -\frac{R_2}{R_g} \cdot V_1 + \left( \frac{R_2}{R_g} + 1 \right) V_2 - \left[ \left( \frac{R_2}{R_g} + 1 \right) V_1 - \frac{R_2}{R_g} \cdot V_2 \right] \\
 &= -\frac{R_2}{R_g} V_1 + \left( \frac{R_2}{R_g} + 1 \right) V_2 - \left( \frac{R_2}{R_g} + 1 \right) V_1 + \frac{R_2}{R_g} V_2
 \end{aligned}$$

$$V_{\text{out}} = \left( \frac{R_2}{R_g} + 1 \right) (V_2 - V_1) + \frac{R_2}{R_g} (V_2 - V_1)$$