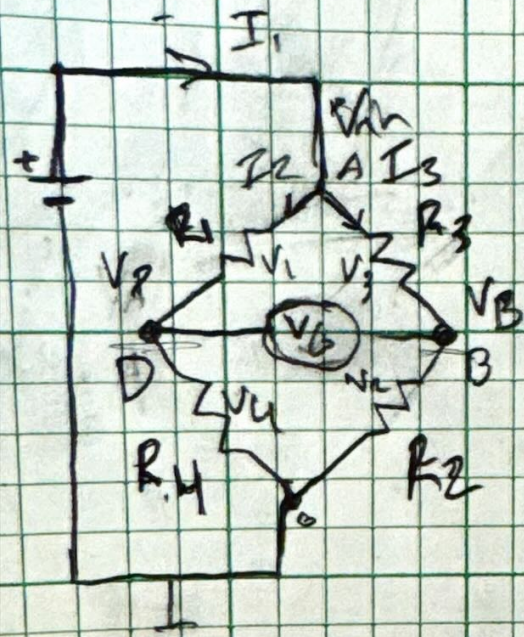
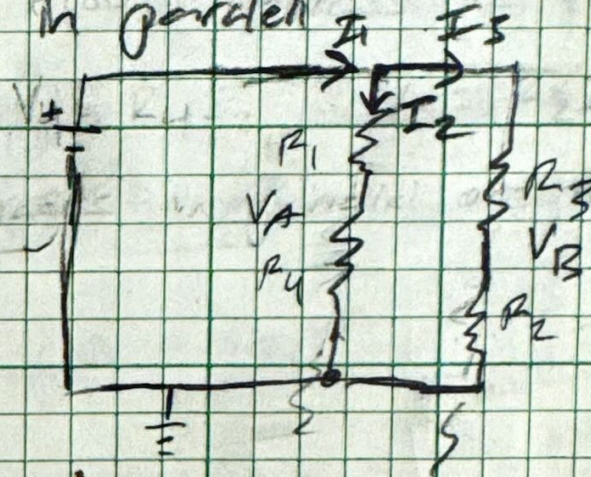


Wheatstone bridge



$$I_1 = I_2 + I_3$$

When $V_g = 0$ No current flows over the center therefore this circuit behaves like 2 circuits in parallel



$$V_D = V_B$$

$$V_D = I_2 R_4$$

$$V_{in} = (R_4 + R_1) I_2$$

$$I_2 = \frac{V_{in}}{(R_4 + R_1)} = \frac{V_D}{R_4}$$

$$\rightarrow V_D = \frac{V_{in} \cdot R_4}{(R_4 + R_1)}$$

$$V_B = I_3 R_2$$

$$V_{in} = (R_3 + R_2) I_3$$

$$\frac{V_B}{R_2} = \frac{V_{in}}{(R_3 + R_2)}$$

$$\rightarrow \frac{V_{in} \cdot R_2}{(R_3 + R_2)} = \frac{V_{in} \cdot R_4}{(R_4 + R_1)}$$

$$\boxed{\frac{R_2}{R_3 + R_2} = \frac{R_4}{R_4 + R_1}}$$

for an ideal bridge