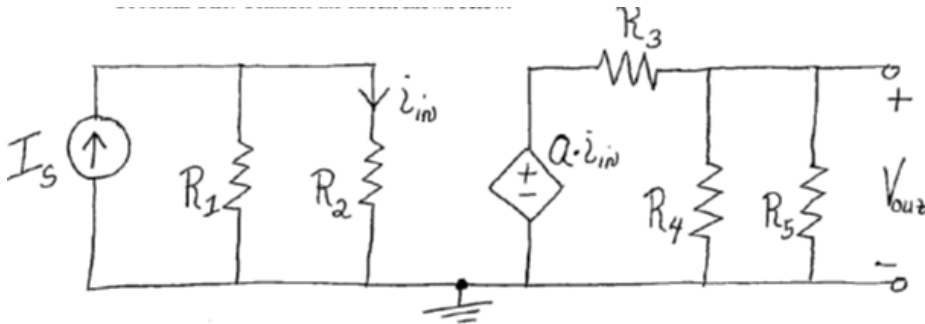


Her Gaskins



Determine an expression for V_{out}/I_s . Your final answer should not have any "Req" term. (Note: there are no numerical values in this problem; thus - your final answer should be in terms of the resistors and the parameter "a"). (25 points)

$$i_{in} = \frac{R_1}{R_1 + R_2} I_s$$

$$I_s = \frac{i_{in}}{\left(\frac{R_1}{R_1 + R_2}\right)}$$

$$I_s = \frac{i_{in} (R_1 + R_2)}{R_1}$$

$$R_{eq} = \frac{R_4 R_5}{R_4 + R_5}$$

$$V_{out} = \frac{R_{eq}}{R_3 + R_{eq}} a i_{in} \quad V_{out} = \frac{\left(\frac{R_4 R_5}{R_4 + R_5}\right) a i_{in}}{R_3 + \left(\frac{R_4 R_5}{R_4 + R_5}\right)}$$

$$\frac{V_{out}}{I_s} = \frac{\left(\frac{\left(\frac{R_4 R_5}{R_4 + R_5}\right) a i_{in}}{R_3 + \left(\frac{R_4 R_5}{R_4 + R_5}\right)}\right)}{\left(\frac{i_{in} (R_1 + R_2)}{R_1}\right)}$$

$$\frac{R_3 R_4 + R_3 R_5 + R_4 R_5}{R_4 + R_5}$$

$$\frac{R_4 R_5 a i_{in}}{R_3 R_4 + R_3 R_5 + R_4 R_5} \left(\frac{R_1}{i_{in} R_1 + i_{in} R_2}\right)$$

$$\frac{V_{out}}{I_s} = \frac{R_1 R_4 R_5 a}{R_1 R_3 R_4 + R_1 R_3 R_5 + R_1 R_4 R_5 + R_2 R_3 R_4 + R_2 R_3 R_5 + R_2 R_4 R_5}$$