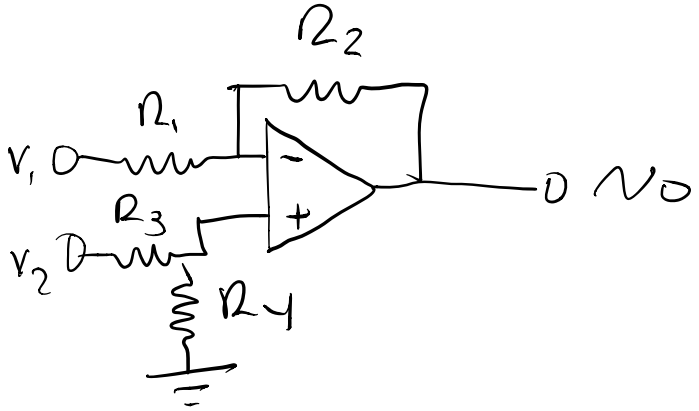
Nolan Anderson Quiz 2B

1) $A_d = 40\ V/V$ $A_{CM} = 0$

$R_{id} = 100 = 2R_1$

$R_1 = 50\ k\Omega$

$A_d = 100 = \frac{R_2}{R_1} = 100\frac{R_2}{50}$



$5{,}000 = R_2 \Rightarrow R_2 = 5\ M\Omega$

$R_4 = R_2 = 5\ M\Omega$

$R_3 = R_1 = 50\ k\Omega$

2) $3\ V/V \leq A_d \leq 300\ V/V$ $R_{pot} = 100\ k\Omega$ $\frac{R_4}{R_3} = 1$

$A_d = \left(1 + \frac{2R_2}{2R_1}\right)\underbrace{\left(\frac{R_4}{R_3}\right)}_{\text{second stage gain}}$ Let $R_4 = R_3 = 100\ k\Omega$

$2R_1 = RF + 100\ k\Omega$ { max: $RF + 100$, min: RF

$A_d = 3$ or $A_d = 300$

$\left(1 + \frac{2R_2}{R_f + 100}\right)(1) = 3$ $\frac{2R_2}{RF + 100} = 2$

$2R_2 = 2(RF + 100k\Omega)$ $2R_2$ $R_2 =$

149.5rF

$\left(1 + \frac{2R_2}{RF}\right)(1) = 300$ $2R_2 = 299\ rF$

$R_2 = \frac{299\ rF}{2}$

$294rF = 2rF + 200E3$ $297rF = 200E3$

$R_2 = 149.5\ k\Omega$ $294\ rF = 2RF + 200 \times 10^3\ \Omega$

$297rF = 200 \times 10^3$ $2R_2 =$ $R_2 = 149.5rF$

$RF = 673.40\ \Omega$

$R_2 = 100,673.4 = 100.673\ k\Omega$