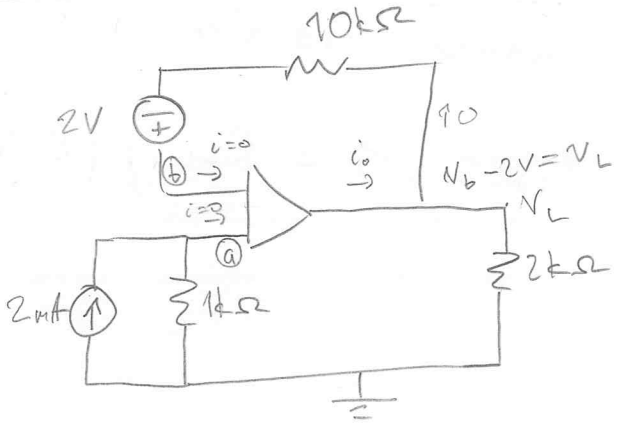
Dani 1

HV 4

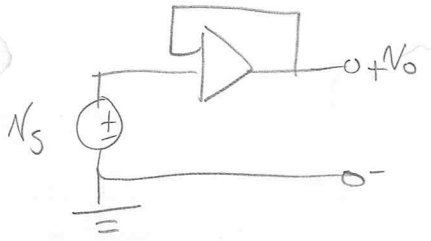


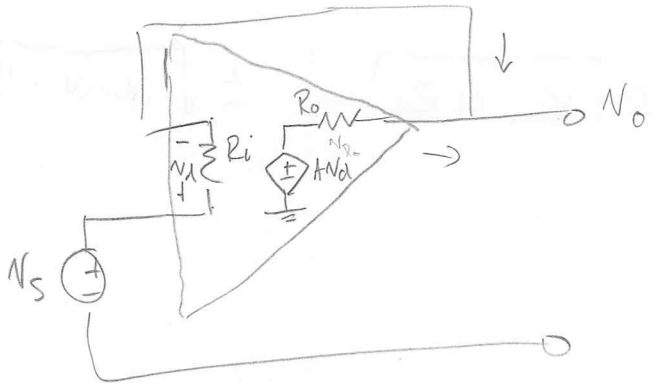
$N_a = 2mA \cdot 1k\Omega = 2V$

$\Rightarrow N_b = 2V$

$\Rightarrow N_L = 2V - 2V = 0V = N_o$

Dani 2





$$\frac{N_d}{R_i} + \frac{A N_d - N_o}{R_o} = 0 \qquad N_d = N_S - N_o$$

$$\frac{N_S - N_o}{R_i} + \frac{A(N_S - N_o) - N_o}{R_o} = 0$$

$$\left(\frac{1}{R_i} + \frac{A}{R_o}\right) N_S = N_o \left(\frac{1}{R_i} + \frac{A+1}{R_o}\right)$$

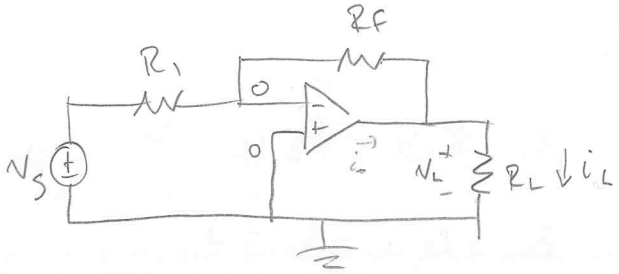
$$\frac{N_o}{N_S} = \left(\frac{R_o + A R_i}{R_i R_o}\right)\left(\frac{R_i R_o}{R_o + R_i(A+1)}\right) = \frac{R_o + A R_i}{R_o + R_i(A+1)}$$

KAGM

$R_o \to 0$, $R_i \to \infty$, $A \to \infty$

$$\frac{\frac{R_o}{A R_i}^{\to 0} + 1}{\frac{R_o}{A R_i}^{\to 0} + 1 + \frac{1}{A}^{\to 0}} = \frac{1}{1} = 1$$

Dami 3

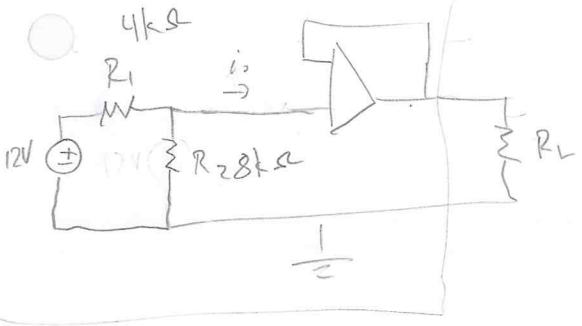


$$\frac{V_s}{R_1} = -\frac{V_L}{R_f} \Rightarrow V_L = -V_s \frac{R_f}{R_1}$$

$$i_L = \frac{V_L}{R_L} = -\frac{V_s R_f}{R_1 R_L}$$

$$i_{sc} = \frac{V_s}{R_1}$$

Dami 4



$$V_a = \frac{R_2}{R_1+R_2} \cdot 12 \overset{!}{=} 8$$

$$\frac{R_2}{R_1+R_2} = \frac{8}{12} \Rightarrow \begin{matrix} R_2 = 8k\Omega \\ R_1 = 12-8 = 4k\Omega \end{matrix}$$

Vaom: 5

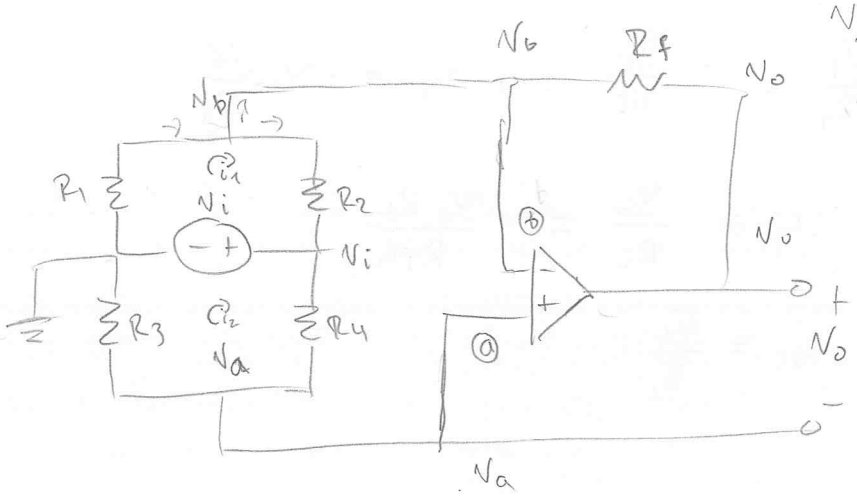
$R_t \simeq 1k\Omega$ vegna Max power transfer

$P_{max} = \frac{V_t^2}{4R_t}$ (eq. 4.24) (P_{max} þegar $R_L = R_{th}$) (K 4.8)

$P_{max} \simeq 36mW$

$V_t = \pm\sqrt{P_{max} 4 R_t} = \pm\sqrt{36mV \cdot 4k\Omega} = \pm 12V$

Vamos 0



$$V_b + V_i + V_a = 0$$

$$V_a = V_b$$

$$V_i - R_4 i_2 - R_3 i_2 = 0$$

$$R_1 i_1 + R_2 i_1 - V_i = 0$$

$$\underbrace{R_1 i_1 + R_2 i_1}_{-V_b} = \underbrace{R_4 i_2 + R_3 i_2}_{-V_a} = V_i$$

$$-V_b - \frac{R_2 V_b}{R_1} = V_i$$

$$-V_b (R_1 + R_2) = R_1 V_i$$

$$V_b = \frac{-R_1}{R_1 + R_2} V_i$$

$$\frac{-V_b}{R_1} = \frac{V_b - V_o}{R_f} + \frac{V_b - V_i}{R_2}$$

$$V_o = R_f \left(\frac{V_b}{R_f} + \frac{V_b}{R_1} + \frac{V_b}{R_2} - \frac{V_i}{R_2} \right) = V_b \left(1 + \frac{R_f}{R_1} + \frac{R_f}{R_2} \right) - \frac{V_i}{R_2}$$

$$V_o = V_i \left[\frac{-R_1}{R_1 + R_2} \left(1 + \frac{R_f}{R_1} + \frac{R_f}{R_2} \right) - \frac{1}{R_2} \right]$$

$$k = \frac{-R_1}{R_1 + R_2} \left(1 + \frac{R_f}{R_1} + \frac{R_f}{R_2} \right) - \frac{1}{R_2}$$