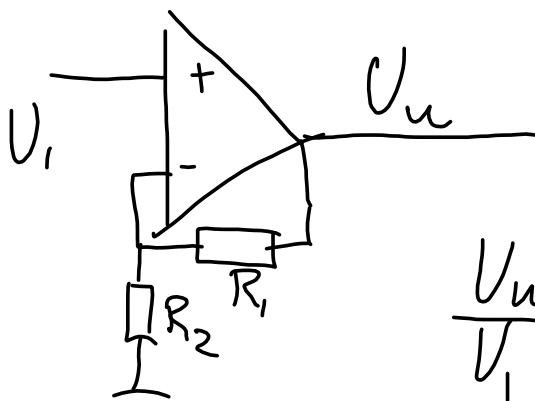


Ikke invertierende forsterker



$$\frac{U_u}{U_1} = 8,3 \text{ ggr}$$

$$\frac{U_u}{U_1} = 1 + \frac{R_1}{R_2} = 8,3$$

$$\frac{U_u}{R_1 + R_2} \cdot R_2 = U_1$$

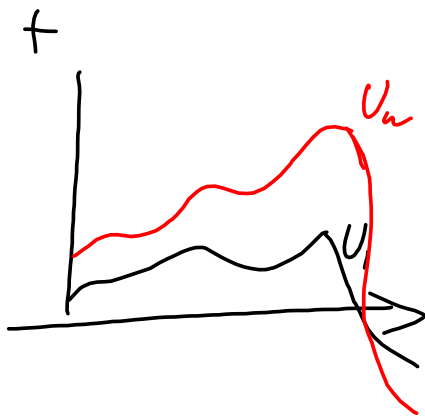
$$\frac{U_u}{U_1} = \frac{R_1 + R_2}{R_2} = 1 + \frac{R_1}{R_2}$$

$$\frac{R_1}{R_2} = 8,3 - 1 = 7,3$$

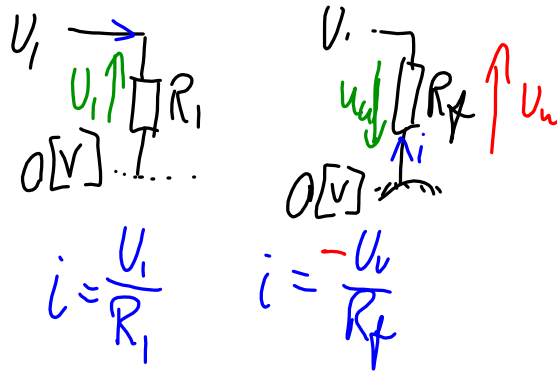
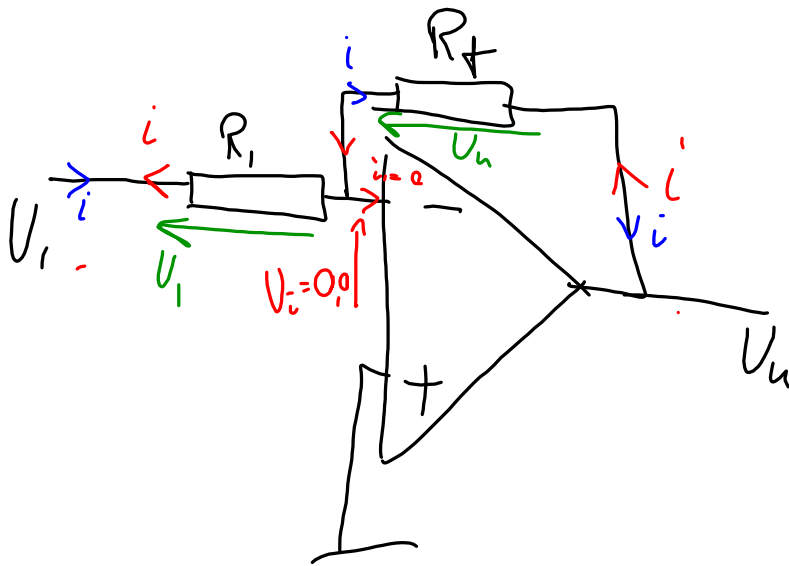
$$R_1 = 7,3 \cdot R_2$$

Velger $R_2 = 1,2 \text{ k}\Omega$

$$R_1 = 7,3 \cdot 1,2 \text{ k}\Omega = 8,76 \text{ k}\Omega$$



Inverterende forsterker



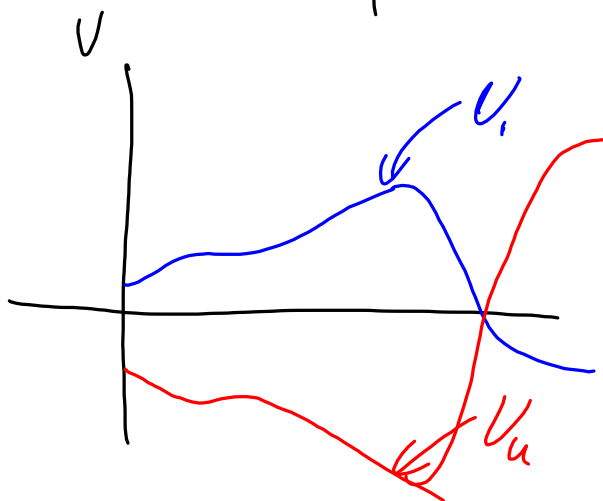
$$i = \frac{U_i}{R_1}$$

$$i = -\frac{U_u}{R_f}$$

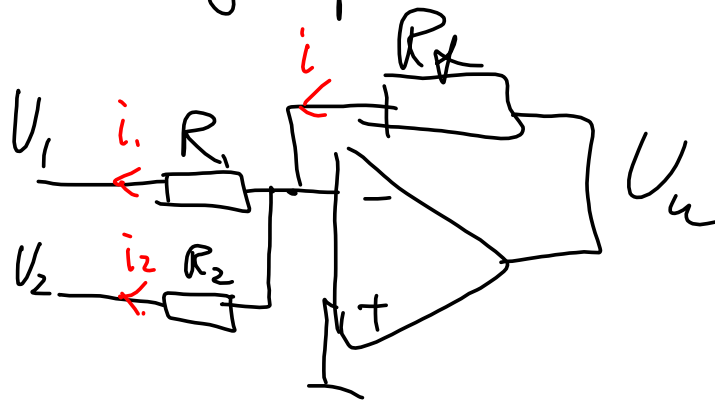
$$\frac{U_i}{R_1} = -\frac{U_u}{R_f}$$

inverterende

$$\frac{U_u}{U_i} = -\frac{R_f}{R_1}$$



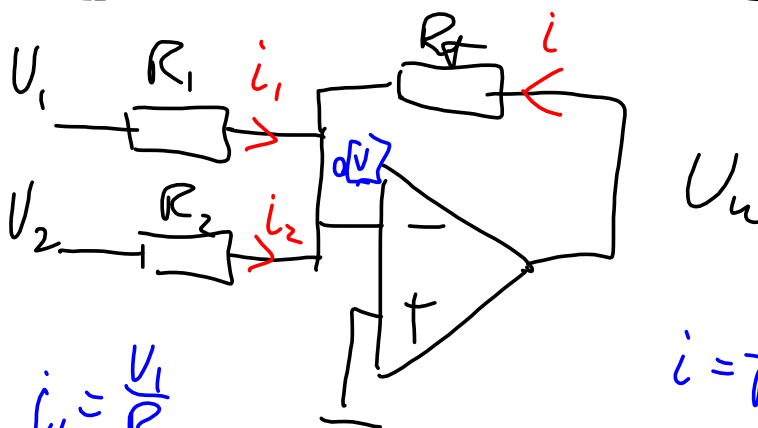
Summasjonsforsterker



$$i = i_1 + i_2$$

$$\frac{U_u}{R_f} = - \left(\frac{U_1}{R_1} + \frac{U_2}{R_2} \right)$$

$$U_u = - \left(\frac{U_1 \cdot R_f}{R_1} + \frac{U_2 \cdot R_f}{R_2} \right)$$



$$i = \frac{U_u}{R_f}$$

$$i_1 = \frac{U_1}{R_1}$$

$$i_2 = \frac{U_2}{R_2}$$

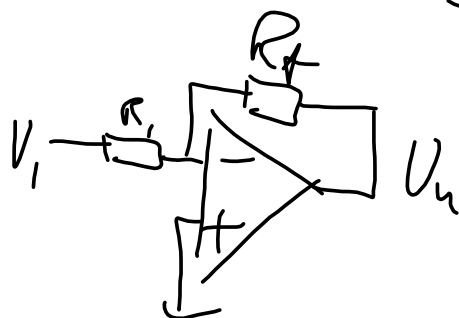
$$i + i_1 + i_2 = 0$$

$$i = -i_1 - i_2$$

$$\frac{U_u}{R_f} = - \frac{U_1}{R_1} - \frac{U_2}{R_2} = - \left(\frac{U_1}{R_1} + \frac{U_2}{R_2} \right)$$

Førsterkning med inverterende førsterker

Ekse: Førsterkning på 8,3 [opp]

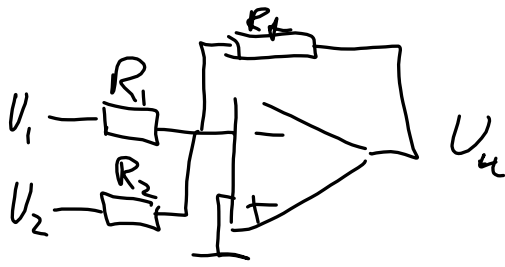


$$\frac{U_u}{V_1} = -\frac{R_f}{R_1} = -8,3$$

$$R_f = 8,3 \cdot R_1$$

Velger $R_1 = 1,2 \text{ K}$

$$R_f = 8,3 \cdot 1,2 \text{ K}\Omega = 9,96 \text{ K}\Omega = 10 \text{ K}\Omega$$



$$\frac{U_u}{R_f} = - \left(\frac{U_1}{R_1} + \frac{U_2}{R_2} \right)$$

$$U_u = - \left(\frac{U_1 \cdot R_f}{R_1} + \frac{U_2 \cdot R_f}{R_2} \right)$$

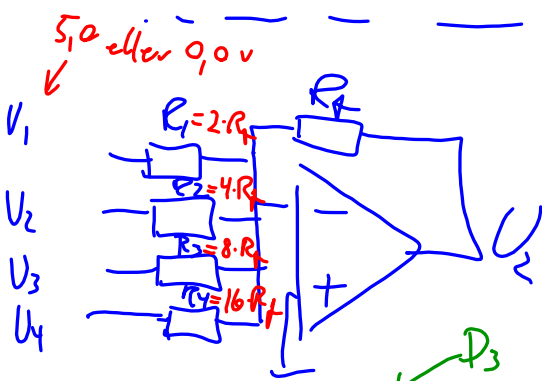
Eller:

U_1 og U_2 er 5,0V

$$R_1 = 2 \cdot R_f \quad R_2 = 4 \cdot R_f$$

$$U_u = - \left(\frac{5,0[V] \cdot R_f}{2 \cdot R_f} + \frac{5,0[V] \cdot R_f}{4 \cdot R_f} \right)$$

$$U_u = - (2,5[V] + 1,25[V]) = -3,75[V]$$



4-bit DAC

$$U_2 = - \left(\frac{5,0[V]}{2} + \frac{5,0[V]}{4} + \frac{5,0[V]}{8} + \frac{5,0[V]}{16} \right)$$

↑ 2,5V
↓ 1,25V
↓ 0,63V
↓ 0,31V
↑

