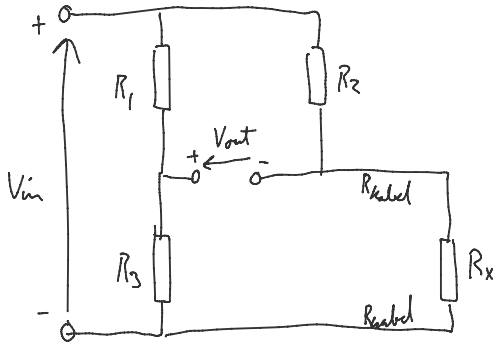
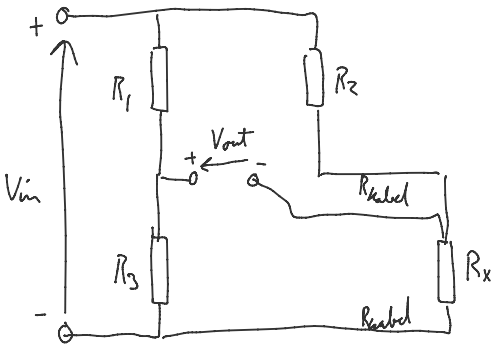
2

onsdag 20. september 2023 15:20

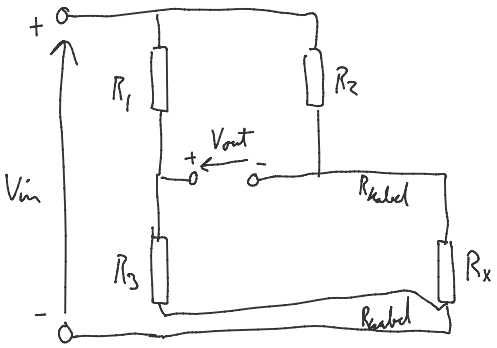
a) 2-leder



3-leder

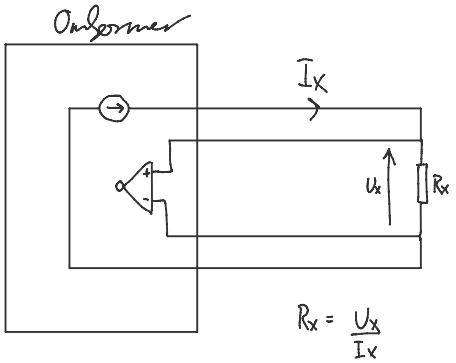


eller



minimerer effekten av kabelmotstand

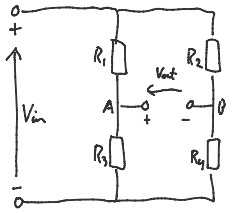
4-leder



Kelvin-bro

opampen dimmer kabelmotstånd

b)



$$V_{out} = V_A - V_B = \left(\frac{R_3}{R_1 + R_3} - \frac{R_4}{R_2 + R_4} \right) V_{in}$$

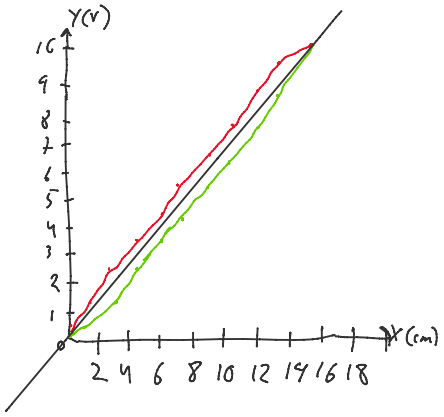
$$R_4 = R_0 + \Delta R$$

$$V_{out} = \left(\frac{R_3}{R_1 + R_3} - \frac{R_0 + \Delta R}{R_2 + R_0 + \Delta R} \right) V_{in}$$

3

torsdag 21. september 2023 14:25

a)



b) Bruker ordinatpunkt

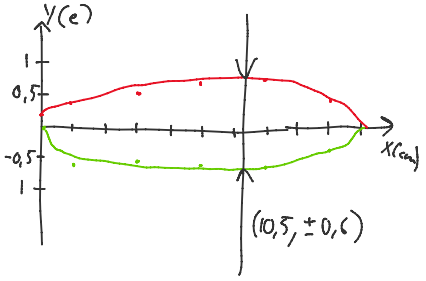
$Y = aX + \beta$

$\frac{\Delta Y}{\Delta X} = \frac{10,2 - 0}{15 - 0}$ $\quad \beta = 0$

$a = 0,68$

$Y = 0,68X$

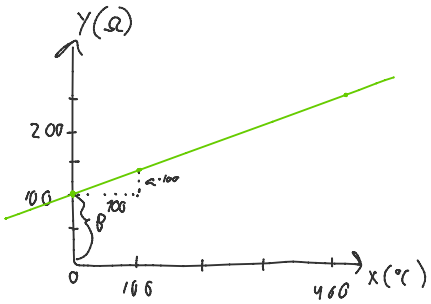
c)



4

torsdag 21. september 2023 14:53

a)



lineær: $Y = ax + \beta = \frac{138.5}{100}X + 100$

$Y = 1{,}385X + 100$

$R(t) = R_0(1 + At + Bt^2)$

$= R_0 + R_0At + R_0Bt^2$ ($B = 0$)

$1{,}385X + 100 = R_0At + R_0$

$R_0A = 1{,}385 \qquad R_0 = 100$

$A = \frac{1{,}385}{100} = 0{,}01385$

$A = 0{,}01385$

$B = 0$

$R_0 = 100$

b) $R(t) = 1{,}385t + 100$

$R(175{,}8) = 1{,}385 \cdot 175{,}8 + 100 = 343{,}483$

$R(175{,}8) = 344\,\Omega$

5

tirsdag 26. september 2023 00:04

$$M = \rho_1 \pi R^2 l + \rho_2 \frac{1}{2}\frac{4}{3}\pi R^3$$

$$M = 3{,}5\pi 4^2 10 + 2{,}5\frac{1}{2}\frac{4}{3}\pi 4^3 = \frac{2000\pi}{3} = 2094{,}395$$

$$a = \left(\frac{dM}{d\rho_1}\delta\rho_1\right)^2 = \left(\pi R^2 l \delta\rho_1\right)^2$$

$$B = \left(\frac{dM}{dl}\delta l\right)^2 = \left(\rho_1 \pi R^2 \delta l\right)^2$$

$$C = \left(\frac{dM}{dR}\delta R\right)^2 = \left(\left(\rho_1 \pi 2Rl + \rho_2 \frac{1}{2}\frac{4}{3}\pi 3R^2\right)\delta R\right)^2$$

$$D = \left(\frac{dM}{d\rho_2}\delta\rho_2\right)^2 = \left(\frac{1}{2}\frac{4}{3}\pi R^3 \delta\rho_2\right)^2$$

$$\Delta M = \sqrt{a+B+C+D} = 77{,}97$$

$$\underline{M = 2094{,}40 \pm 77{,}97}$$