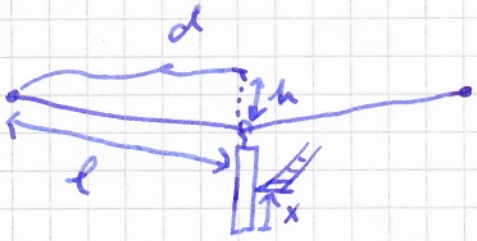
Provförning, resistanstråd



$$\delta = l - l_0 = \sqrt{d^2 + h^2} - \sqrt{d^2 + h_0^2}$$

$$\approx d\left[\left(1 + \frac{h^2}{2d^2}\right) - \left(1 + \frac{h_0^2}{2d^2}\right)\right] = \frac{h^2 - h_0^2}{2d}$$

Mätning ger: $d = 50$ cm

$h_0 = 2{,}0$ cm

$x_0 = 22{,}0$ cm

$l_0 \alpha \Delta T = \delta \Leftrightarrow \Delta T = \frac{\delta}{\alpha l_0} \approx \frac{\delta}{\alpha d}$, $\alpha = 13{,}5 \cdot 10^{-6}\ K^{-1}$

Årsvalningsekvationen ger:

$$\left.\begin{array}{l} P = k \Delta T. \\ \text{Men: } P = R i^2 \end{array}\right\} \Rightarrow \Delta T = \frac{R}{k} i^2$$

Vi gör några mätningar för att bekräfta detta

i/[A]	x/[cm]	$h = (x - x_0)$/[cm]	$\delta = \left(\frac{h^2 - h_0^2}{2d}\right)$/[mm]	$\Delta T = \frac{\delta}{\alpha d}$ /[°C]
0,50	24,5	2,5	0,225	33
0,25	24,2	2,2	0,084	12
0,71	25,1	3,1	0,561	83
1,00	25,8	3,8	1,044	155
1,41	27,0	5,0	2,100	311
1,86	28,4	6,9	3,696	548

2. ~~$R \approx 18\ \Omega$~~ ~~$P_{el} = R i^2 = 62$ W~~ ~~$= 2$ m~~ ~~$= 0{,}2$ mm~~

Vid $i = 1{,}86$ A Blir: $P_{strål.} = \sigma T^4 \cdot 2l \cdot \pi d_{tråd} \approx 16$ W

$T = 548\ ^\circ C = 821$ K

2