$\Delta\alpha = 0.5°$ $l = 129\,cm$

Keha 1

$m = 1.375\,kg$ $d = 60\,mm$

Katse nr.	$\alpha \pm \Delta\alpha, °$	t, s	$t_i - \bar{t}, s$	$(t_i - \bar{t})^2, s^2$	$\sin a$	$I, kg \cdot m^2$	$I_t, kg \cdot m^2$
1.	10	1.584	0.0318	0.0010	0.1736	0.8119	0.6188
2.	10	1.563	0.0108	0.0001	0.1736	0.7579	0.6188
3.	10	1.552	-0.0002	0.0000	0.1736	0.7299	0.6188
4.	10	1.542	-0.0102	0.0001	0.1736	0.7047	0.6188
5.	10	1.520	-0.0322	0.0010	0.1736	0.6496	0.6188

$\bar{t} \approx 1.5522$ $\sum_{i=1}^{5} t_i - \bar{t} \approx 0.0023$ $\bar{I} \approx 0.6995$

Keha 2

$m = 0.259\,g$ $d = 58.7\,mm$ $d_i = 30\,mm$

Katse nr.	$\alpha \pm \Delta\alpha, °$	t, s	$t_i - \bar{t}, s$	$(t_i - \bar{t})^2, s^2$	$\sin a$	$I, kg \cdot m^2$	$I_t, kg \cdot m^2$
1.	10	1.584	0.0040	0.0000	0.1736	1.4638	1.1155
2.	10	1.574	-0.0060	0.0000	0.1736	1.4173	1.1155
3.	10	1.584	0.0040	0.0000	0.1736	1.4638	1.1155
4.	10	1.584	0.0040	0.0000	0.1736	1.4638	1.1155
5.	10	1.574	-0.0060	0.0000	0.1736	1.4173	1.1155

$\bar{t} \approx 1.58$ $\sum_{i=1}^{5} t_i - \bar{t} \approx 0.0001$ $\bar{I} \approx 1.4452$

$$I = mr^2\left(\frac{g t^2 \sin\alpha}{2l} - 1\right) \quad (6)$$

$$I_t = \frac{mr^2}{2}$$

Määramatus

Eeldame, et kõik tulemused on usaldatavusega 0,95.

$$U_C(m) = 2\frac{0.0005}{3} \quad U_C(r) = \frac{5 \cdot 10^{-5}}{3} \quad U_C(t) = 2.8\sqrt{\frac{\sum_{i=1}^{5} t_i - \bar{t}}{5(5-1)}} \quad U_C(\alpha) = 0.5 \quad U_C(l) = 2\frac{0.0005}{3}$$

Eksperimentaalne

$$U_C(I)=\sqrt{\left(\frac{\partial I_t}{\partial m}\cdot U_C(m)\right)^2+\left(\frac{\partial I_t}{\partial r}\cdot U_C(r)\right)^2+\left(\frac{\partial I_t}{\partial t}\cdot U_C(t)\right)^2+\left(\frac{\partial I_t}{\partial \alpha}\cdot U_C(\alpha)\right)^2+\left(\frac{\partial I_t}{\partial l}\cdot U_C(l)\right)^2}$$

$$(U_C(I))^2=\left(r^2\left(\frac{g t^2 \sin\alpha}{2l}-1\right)\cdot U_C(m)\right)^2+\left(\frac{m r(g t^2\sin(a)-2l)}{l}\cdot U_C(r)\right)^2+ \quad ...$$

$$... \quad +\left(\frac{g m r^2 t \sin\alpha}{l}\cdot U_C(t)\right)^2+\left(\frac{g m r^2 t^2\cos\alpha}{2l}\cdot U_C(\alpha)\right)^2+\left(\frac{-g m r^2 t^2\sin\alpha}{2l^2}\cdot U_C(l)\right)^2$$

$U_C(I_1)=0.09826644$ $U_C(I_2)=0.00001803$

Teoreetiline

$$U_C(I_t)=\sqrt{\left(\frac{\partial I_t}{\partial m}\cdot U_C(m)\right)^2+\left(\frac{\partial I_t}{\partial r}\cdot U_C(r)\right)^2}$$

$$U_C(I_t)=\sqrt{(m r\cdot U_C(m))^2+\left(\frac{r^2}{2}\cdot U_C(r)\right)^2}$$

$U_{C_1}(I_{t1})=0.01375000$ $U_{C_2}(I_{t2})=0.00000253$

Tulemused

Keha 1

$I=0.6995\pm 0.0983\, kg\cdot m^2$

$I_t=0.5922\pm 0.0138\, kg\cdot m^2$

Keha 2

$I=(1.445\pm 0.180)\cdot 10^{-4}\, kg\cdot m^2$

$I_t=(1.115\pm 0.025)\cdot 10^{-4}\, kg\cdot m^2$