Ms 5098/28-31. Eötvös Loránd jegyzetei a fizadéknál felsőbb fenmaltságokon

Csepp [illegible] tan

Felületi feldolgozás feszültsége

Módszer

és formula számítás.

Legyen l a vizsgálandó pontok derékszögű ordinátája a legels irányában t amely erre merőleges ordinátája. ~~akkor minden [illegible]~~ ε a szöget melyet a vizsgált egyik [illegible] legyen akkor kis az l, t pontban vizsgált vonal egyenlete:

$$t-\tau=(l-\lambda)\operatorname{tg}\varepsilon$$

vagy a melyben $\operatorname{tg}\varepsilon$ kicsiny.

$$t-\tau=(l-\lambda)\varepsilon$$

tehát a katakaustikus görbének egyenlete [illegible]

meghatározva

$$\frac{dt}{d\varepsilon}=(l-\lambda)+\varepsilon\frac{dl}{d\varepsilon}$$

$$l-\lambda=\frac{dt}{d\varepsilon}-\varepsilon\frac{dl}{d\varepsilon} \qquad t-\tau=\varepsilon\frac{dt}{d\varepsilon}-\varepsilon^2\frac{dl}{d\varepsilon}$$

Ha $\varepsilon=0$ és l_0 t_0 akkor.

$$l_0-\lambda_0=\left(\frac{dt}{d\varepsilon}\right)_0 \qquad \tau=t-\varepsilon\frac{dt}{d\varepsilon}+\varepsilon^2\frac{dl}{d\varepsilon}$$

$$t_0-\tau_0=0 \qquad \tau_0=t_0$$

$$\lambda-\lambda_0=l-l_0+\varepsilon\frac{dl}{d\varepsilon}-\frac{dt}{d\varepsilon}+\left(\frac{dt}{d\varepsilon}\right)_0$$

$$\tau-\tau_0=t-t_0-\varepsilon\frac{dt}{d\varepsilon}+\varepsilon^2\frac{dl}{d\varepsilon}$$

itt [illegible] a transversalis eltérés el.

$$t=t_0\mp\varepsilon\left(\frac{dt}{d\varepsilon}\right)_0+\frac{\varepsilon^2}{1.2}\left(\frac{d^2t}{d\varepsilon^2}\right)_0+\frac{\varepsilon^3}{1.2.3}\left(\frac{d^3t}{d\varepsilon^3}\right)_0+\cdots$$

$$\varepsilon\frac{dt}{d\varepsilon}=\varepsilon\left(\frac{dt}{d\varepsilon}\right)_0+\varepsilon^2\left(\frac{d^2t}{d\varepsilon^2}\right)_0+\frac{\varepsilon^3}{1.2}\left(\frac{d^3t}{d\varepsilon^3}\right)_0+\cdots$$

$$-\left(1-\frac{1}{1.2}\right)\varepsilon^2\left(\frac{d^2t}{d\varepsilon^2}\right)_0-\frac{1}{1.2}\left(1-\frac{1}{3}\right)\left(\frac{d^3t}{d\varepsilon^3}\right)_0+\cdots$$

$$-\frac{1}{2} \qquad -\frac{2}{1.2.3} \qquad -\frac{3}{1.2.3.4}$$

$$\tau-t_0=\varepsilon^2\frac{dl}{d\varepsilon}-\left\{\frac{\varepsilon^2}{1.2}\cdot\frac{d^2t}{d\varepsilon^2}+\frac{2\varepsilon^3}{1.2.3}\frac{d^3t}{d\varepsilon^3}+\frac{3\varepsilon^4}{1.2.3.4}\cdot\frac{d^4t}{d\varepsilon^4}+\cdots\right\}$$

$\frac{d^2}{d\varepsilon^2}$ $-\frac{c}{8}\frac{\cos\frac{\vartheta}{2}}{\sin^2\frac{\vartheta}{2}}-\frac{c}{4}\cos\frac{\vartheta}{2}$ a erre vonatkozó előjelű

$$\frac{dx}{dz} = \frac{dx}{d\delta}\cdot\frac{d\delta}{dz} = \frac{c}{8}\cdot\frac{\cos\delta}{\sin\frac{\delta}{2}}$$

$\frac{d\delta}{dz} = \frac{1}{z}$

$$\frac{d^2x}{dz^2} = \frac{c}{16} - \frac{c}{16}\frac{\sin\delta}{\sin\frac{\delta}{2}} - \frac{c}{32}\frac{\cos\delta\cos\frac{\delta}{2}}{\sin^2\frac{\delta}{2}} = -\frac{c}{32}\frac{2\sin\delta\sin\frac{\delta}{2} + \cos\delta\cos\frac{\delta}{2}}{\sin^2\frac{\delta}{2}}$$

$$-\frac{c}{8}\frac{1}{4}\frac{\cdots}{2\sin\frac{\delta}{2}}$$

$$\sin\delta\sin\frac{\delta}{2}$$

$$4\sin^2\frac{\delta}{2}\cos\frac{\delta}{2} + \cos\frac{\delta}{2}\cos\delta$$

$$\cos\frac{\delta}{2}\left(\cos^2\frac{\delta}{2} - \sin^2\frac{\delta}{2} + 4\sin^2\frac{\delta}{2}\right)$$

$$\cos\frac{\delta}{2}\left(\cos^2\frac{\delta}{2} + 3\sin^2\frac{\delta}{2}\right)$$

$$\cos\frac{\delta}{2}\left(1 + 2\sin^2\frac{\delta}{2}\right)$$

$$\frac{d^3x}{dz^3} = -\frac{c}{32}\frac{\cos\frac{\delta}{2}}{\sin^2\frac{\delta}{2}} - \frac{c}{16}$$

$$\frac{d^3x}{dz^3} = +\frac{c}{128}\frac{\sin\frac{\delta}{2}}{\sin^2\frac{\delta}{2}} + \frac{1}{4\cdot32}\frac{2c\cos\frac{\delta}{2}\cos\frac{\delta}{2}}{\sin^3\frac{\delta}{2}}$$

$$1 + \cos^2\frac{\delta}{2}$$
$$\sin^2\frac{\delta}{2} + \cos^2\frac{\delta}{2} + \cos^2\frac{\delta}{2}$$

$$\frac{d^3x}{dz^3} = \frac{c}{128}\frac{\sin^2\frac{\delta}{2} + 2\cos^2\frac{\delta}{2}}{\sin^3\frac{\delta}{2}} = \frac{c}{128}\frac{1+\cos^2\frac{\delta}{2}}{\sin^3\frac{\delta}{2}}$$

$$\frac{1}{\sin\alpha} = -\frac{\cos\alpha}{\sin^2\alpha}$$

$$\frac{d^4x}{dz^4} = -\frac{c}{128}\frac{2}{4}\cdot\frac{\cos\frac{\delta}{2}\sin\frac{\delta}{2}}{\sin^3\frac{\delta}{2}} - \frac{c}{128}\frac{3}{4}\frac{\left(1+\cos^2\frac{\delta}{2}\right)\cos\frac{\delta}{2}}{\sin^4\frac{\delta}{2}}$$

$$+\frac{\sin\alpha}{\sin^4\alpha} + 2\frac{\cos\alpha}{\sin^3\alpha}$$

$$+\frac{\cos\alpha}{\sin^4\alpha} + \frac{2\sin\alpha}{\sin^3\alpha} - 6\frac{\cos\alpha\cos\alpha}{\sin^4\alpha}$$

$$\frac{\cos\delta}{\sin\frac{\delta}{2}} \qquad \frac{\cos^2\frac{\delta}{2} - \sin^2\frac{\delta}{2}}{\sin\frac{\delta}{2}}$$

$$1 - \sin^2\frac{\delta}{2}$$

$$\frac{d^4x}{dt^4} = \frac{d^3}{dt^3}\left(\frac{1}{\sin\delta}\right) - \frac{d^3}{dt^3}(2\sin\delta)$$

$$\sin\delta = x$$

$$\frac{d^n}{dt^n}\left(\frac{1}{x}\right) = \frac{d^n}{dx^n}\cdot\frac{dx}{dt}.$$

$$\frac{d}{dx}\left(\frac{1}{y}\right) = \cdot \qquad f(x) = y$$

$$\frac{d}{dx}f(x) =$$

$$\frac{d}{dx}f(y) = \frac{df}{dy}\cdot\frac{dy}{dx}$$

$$\frac{d^2}{dx^2}(f(y)) = \frac{d^2f}{dy^2}\cdot\left(\frac{dy}{dx}\right)^2 + \frac{df}{dy}\cdot\frac{d^2y}{dx^2}$$

$$\frac{d^2f}{dy^2}\cdot\frac{d^3f}{dy^3}\left(\frac{dy}{dx}\right)^3 + \frac{d^2f}{dy^2}\cdot 2\frac{dy}{dx}\cdot\frac{d^2y}{dx^2} + \frac{d^2f}{dy}\frac{dy}{dx}$$

$$z = c \sin\frac{\delta}{2}$$

$$x = c\left(\frac{1}{2}\ln\operatorname{tg}\frac{\delta}{4} + \cos\frac{\delta}{2}\right) + C \qquad c = aV_2$$

$$\frac{dz}{d\delta} = \frac{1}{2} c \cos\frac{\delta}{2}$$

$$\frac{dx}{d\delta} = c\,\frac{1}{2}\,\frac{1}{\operatorname{tg}\frac{\delta}{4}} \cdot \frac{1}{\cos^2\frac{\delta}{4}} \cdot \frac{1}{4} - \frac{1}{2} c \sin\frac{\delta}{2}$$

$$= \frac{c}{8} \cdot \frac{1}{\sin\frac{\delta}{4}\cos\frac{\delta}{4}} - \frac{c}{2}\sin\frac{\delta}{2}$$

$$\frac{1}{2}\sin\frac{\delta}{2}$$

$$\frac{dx}{d\delta} = \frac{c}{4}\,\frac{1}{\sin\frac{\delta}{2}} - \frac{c}{2}\sin\frac{\delta}{2} = \frac{c}{4}\left(\frac{1}{\sin\frac{\delta}{2}} - 2\sin\frac{\delta}{2}\right) = \frac{c}{4}\,\frac{1-2\sin^2\frac{\delta}{2}}{\sin\frac{\delta}{2}}$$

$$= \frac{c}{4}\,\frac{\cos\delta}{\sin\frac{\delta}{2}}$$

$$\xi = c\sin\frac{\delta}{2} - \frac{1}{4}\sin 2\varepsilon\,\frac{1}{2}\,c\cos\frac{\delta}{2} + \frac{1}{2}\sin^2\varepsilon\,\frac{c}{4}\,\frac{1}{\sin\frac{\delta}{2}} - \frac{1}{2}\sin^2\varepsilon\,\frac{c}{2}\sin\frac{\delta}{2}$$

$$\xi = c\sin\frac{\delta}{2} - \frac{c}{8}\sin 2\varepsilon\cos\frac{\delta}{2} + \frac{c}{8}\,\frac{\sin^2\varepsilon}{\sin\frac{\delta}{2}} - \frac{c}{4}\sin^2\varepsilon\sin\frac{\delta}{2}$$

$$\frac{c}{8}\,\frac{\sin^2\varepsilon}{\sin\frac{\delta}{2}}\left(1 - 2\sin^2\frac{\delta}{2}\right)$$

$$\cos^2\frac{\delta}{2} - \sin^2\frac{\delta}{2}$$

$$\boxed{\cos\frac{\delta}{2}}$$

$$\xi = c\sin\frac{\delta}{2} + \frac{c}{8}\,\frac{\sin^2\varepsilon}{\sin\frac{\delta}{2}}\cos\delta - \frac{c}{8}\sin 2\varepsilon\cos\frac{\delta}{2}$$

$$c\sin\frac{\delta}{2} + \frac{c}{8}\,\frac{1}{\sin\frac{\delta}{2}}\left(\sin^2\varepsilon\cos\delta - \sin 2\varepsilon\sin\frac{\delta}{2}\cos\frac{\delta}{2}\right)$$

$$\left(\sin^2\varepsilon\cos\delta - \frac{\sin 2\varepsilon\,\sin\delta}{2}\right)$$

$$\xi = c\sin\frac{\delta}{2} + \frac{c}{8}\,\frac{\sin\varepsilon}{\sin\frac{\delta}{2}}\left(\cos\delta - \sin\delta\right)$$

$$\frac{\gamma}{2} = \alpha$$

$$\delta = \frac{\gamma}{2} + \frac{z}{2}$$

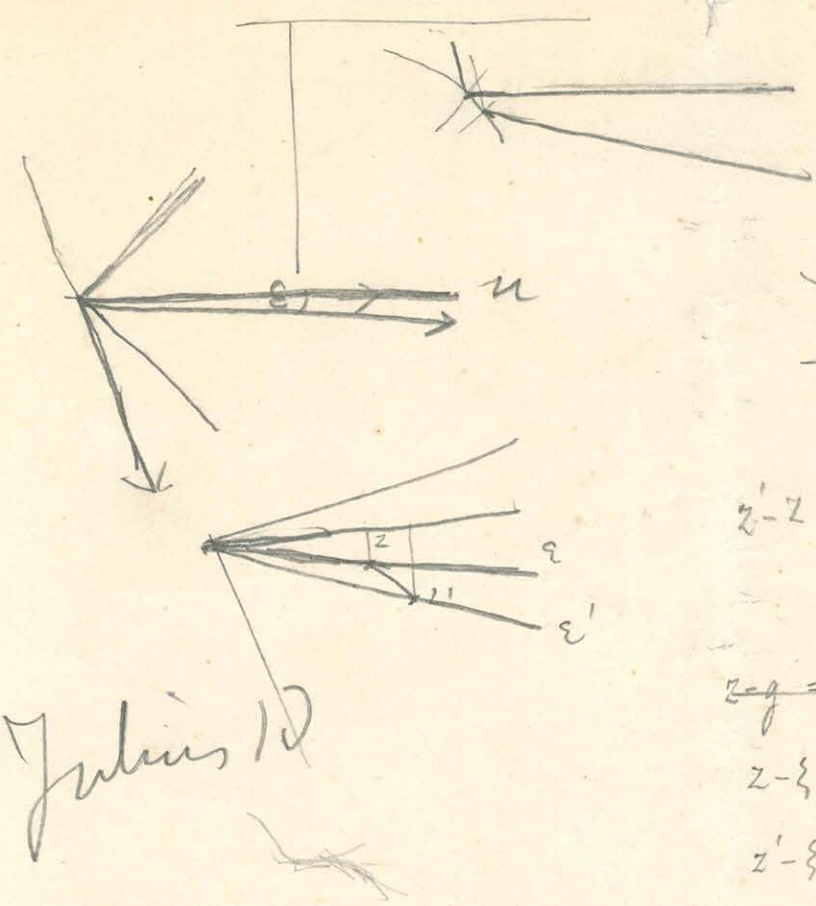
$$\xi = c\sin\frac{\delta}{2} + \frac{c}{8}\,\frac{\sin\varepsilon}{\sin\frac{\delta}{2}}\left(\sin\varepsilon\cos\delta - \sin\delta\right)$$

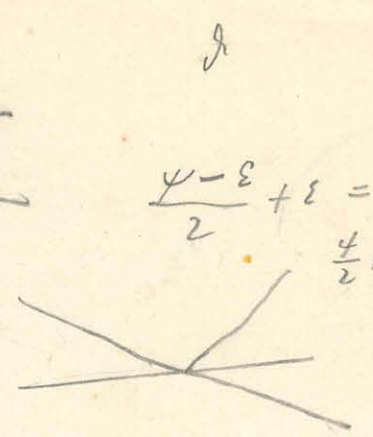
$$\frac{d\delta}{d\varepsilon} = \frac{1}{2}$$

$$\frac{d\xi}{d\varepsilon} = \frac{c}{4}\cos\frac{\delta}{2} + \frac{c}{8}\cos\varepsilon\left(\sin\varepsilon\cos\delta - \sin\delta\right) - \frac{c}{8}\cdot\frac{1}{4}\,\frac{\sin\varepsilon}{\sin^2\frac{\delta}{2}}\left(\sin\varepsilon\cos\delta - \sin\delta\right)\cos\frac{\delta}{2}$$

$$+ \frac{c}{8}\,\frac{\sin\varepsilon}{\sin\frac{\delta}{2}}\left[\cos\varepsilon\cos\delta - \frac{1}{2}\sin\varepsilon\sin\delta - \frac{1}{2}\cos\delta\right]$$

$$= \frac{c}{4}$$





$$\frac{1}{2}\left\{ \sin\left(\frac{\vartheta}{2}+\varepsilon\right) + \sin\left(\frac{\vartheta}{2}-\varepsilon\right) + \frac{c}{8}\frac{\sin\varepsilon}{\sin\frac{\vartheta}{2}+\varepsilon}\Big(\sin\varepsilon\cos(\vartheta+\varepsilon) - \sin(\vartheta+\varepsilon)\Big)\cdot \right.$$

$$\left. + \frac{c}{8}\frac{\sin\varepsilon}{\sin\frac{\vartheta}{2}-\varepsilon}\Big(\sin\varepsilon\cos(\vartheta-\varepsilon) + \sin(\vartheta+\varepsilon)\Big)\right.$$

$$\sin\alpha+\beta + \sin\alpha-\beta = 2\sin\alpha\cos\beta$$

$$\sin(\alpha+\beta)\sin\alpha-\beta = \sin^2\alpha\cos^2\beta - \sin^2\beta\cos^2\alpha$$

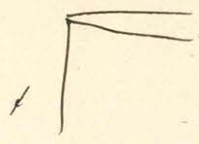
$$\frac{\sin^2\alpha\cos^2\beta - \sin^2\beta + \sin^2\beta\sin^2\alpha}{\sin^2\alpha - \sin^2\beta}$$

$$\frac{1}{2}\left\{ 2\sin\frac{\vartheta}{2}\cos\varepsilon \right.$$

$$\begin{cases} t-\tau = (l-\lambda)\varepsilon \\ \frac{dt}{dz}-\frac{d\tau}{dz} = \left(\frac{dl}{dz}-\frac{d\lambda}{dz}\right)\varepsilon + (l-\lambda) \end{cases}$$

$l \quad \lambda$

$t \quad \tau$



$t-\tau = (l-\lambda)\varepsilon$

$\varepsilon(l-\lambda) = t-\tau$

$\frac{dt}{dz}\varepsilon + (l-\lambda) = t-\tau + \varepsilon\left(\frac{dl}{dz}-\frac{d\lambda}{dz}\right)$

$\varepsilon\frac{dl}{dz} + (l-\lambda) = \varepsilon\frac{dt}{dz}$

$\varepsilon\frac{dl}{dz} + \varepsilon(l-\lambda) = \varepsilon\frac{dt}{dz}$

$\frac{dt}{dz} = l-\lambda + \varepsilon\frac{dl}{dz}$

$l-\lambda = \frac{dt}{dz} - \varepsilon\frac{dl}{dz}$ | $t-\tau = \varepsilon\frac{dt}{dz} - \varepsilon^2\frac{dl}{dz}$

$\lambda = l - \frac{dt}{dz} + \varepsilon\frac{dl}{dz}$, $\tau = t - \varepsilon\frac{dt}{dz} + \varepsilon^2\frac{dl}{dz}$

$\lambda_0 = l_0 - \left(\frac{dt}{dz}\right)_0 + \cdots$

$\tau_0 = t_0$

$\tau_1 = t_0 + \left(\frac{dt}{dz}\right)_0\varepsilon_1 - \varepsilon_1\left(\frac{dt}{dz}\right)_1 + \varepsilon_1^2\left(\frac{dl}{dz}\right)_1$

$t_1 - t_0 = \varepsilon_1$

$\lambda_1 = l_1 - \left(\frac{dt}{dz}\right)_1 + \varepsilon\left(\frac{dl}{dz}\right)_1$

$\tau_0 = t_0$

$\tau_1 = t_1 - \varepsilon_1\left(\frac{dt}{dz}\right)_1 + \varepsilon^2\left(\frac{dl}{dz}\right)_1$

$\lambda_1 - \lambda_0 = l_1 - l_0 - \left\{\left(\frac{dt}{dz}\right)_1 - \left(\frac{dt}{dz}\right)_0\right\} + \varepsilon_1\left(\frac{dl}{dz}\right)_1$

$\tau_1 - \tau_0 = t_1 - t_0 - \varepsilon_1\left(\frac{dt}{dz}\right)_1 + \varepsilon^2\left(\frac{dl}{dz}\right)_1$

$\lambda_1 - \lambda_0$

$\int_0^1 \frac{dt}{dz}dz = t_1 - t_0$

$\int_0^{q_t} \frac{dt}{dz}dz = \varepsilon_1\left(\frac{dl}{dz}\right)_1$

$\frac{dl}{dz} - \frac{d\lambda}{dz} = (l-\lambda) + \varepsilon\frac{dl}{dz} - \varepsilon\frac{dl}{dz}$

$\frac{dl}{dz} - \frac{d\lambda}{dz} = \frac{d^2t}{dz^2} - \frac{dl}{dz} - \varepsilon\frac{d^2l}{dz^2}$

$\frac{dl}{dz} = 2\frac{dl}{dz} - \frac{d^2t}{dz^2} - \varepsilon\frac{d^2l}{dz^2}$

Modrer polygon

Hengerfelület.

$$a = \frac{z_2 - z_1}{\sqrt{2}\left(\sin\frac{\vartheta_2}{2} - \sin\frac{\vartheta_1}{2}\right)}$$

~~573~~
3438

$$z_2 - z_1 = \xi$$

$$\frac{\partial a}{\partial \xi} = \frac{1}{\sqrt{2}\left(\sin\frac{\vartheta_2}{2} - \sin\frac{\vartheta_1}{2}\right)} \qquad dl = \frac{1}{\sqrt{2}\left(\sin\frac{\vartheta_2}{2} - \sin\frac{\vartheta_1}{2}\right)} \delta\xi$$

$$h = \frac{\Delta l}{a} = \frac{\delta\xi}{\xi}$$

$$\frac{\partial a}{\partial \vartheta_1} = a \frac{\cos\frac{\vartheta_1}{2}}{\left(\sin\frac{\vartheta_2}{2} - \sin\frac{\vartheta_1}{2}\right)} \qquad dl = a \cdot \frac{\cos\frac{\vartheta_1}{2}}{\left(\sin\frac{\vartheta_2}{2} - \sin\frac{\vartheta_1}{2}\right)} \delta\vartheta_2$$

$$h_1 = \frac{dl}{a} = \frac{\cos\frac{\vartheta_1}{2}}{\left(\sin\frac{\vartheta_2}{2} - \sin\frac{\vartheta_1}{2}\right)} \delta\vartheta_2$$

$$h_2 = \pm \frac{\cos\frac{\vartheta_2}{2}}{\left(\sin\frac{\vartheta_2}{2} - \sin\frac{\vartheta_1}{2}\right)} \delta\vartheta_1$$

$$\delta\vartheta_2 = \delta\vartheta_1 = 1 \text{ perc} = \frac{1}{3438} =$$

Practical method

$$a = \frac{x_1 - x_2}{\sqrt{2}\left(\cos\frac{\vartheta_1}{2} + \frac{1}{2}\log\operatorname{tg}\frac{\vartheta_1}{4} - \cos\frac{\vartheta_2}{2} - \frac{1}{2}\log\operatorname{tg}\frac{\vartheta_2}{4}\right)}$$

$$\frac{\partial a}{\partial \xi_1} = \frac{1}{N} \qquad dl = \frac{1}{N}\delta\xi$$

$$h = \frac{dl}{a} = \frac{\delta\xi}{\xi}$$

$$\frac{\partial a}{\partial \vartheta_1} = -\frac{a}{4}\left(\cos\frac{\vartheta_1}{2} + \frac{1}{2}\log\operatorname{tg}\frac{\vartheta_1}{4} - \cos\frac{\vartheta_2}{2} - \frac{1}{2}\log\operatorname{tg}\frac{\vartheta_2}{2}\right) \cdot \frac{\cos\frac{\vartheta_1}{2}}{\sin\frac{\vartheta_1}{2}}$$

$$h = \pm \frac{1}{2\sqrt{2}\cdot\sqrt{2}\left(\cos\frac{\vartheta_1}{2} + \frac{1}{2}\log\operatorname{tg}\frac{\vartheta_1}{4} - \cos\frac{\vartheta_2}{2} - \right)} \frac{\cos\frac{\vartheta_1}{2}}{\sin\frac{\vartheta_1}{2}} \delta\vartheta_2$$

ennek értéke például $\vartheta_1 = 16^\circ\,0\frac{1}{2}$ ív perc $= 38^\circ\,52\frac{1}{2}$ ív perc

$\vartheta_1 = 16^\circ\,0'$ ív perc $\qquad h_1 = \pm 4{,}313 \cdot \delta\vartheta_1$

$\vartheta_2 = 38^\circ\,52'$ ív perc $\qquad h_2 = \pm 1{,}468\,\delta\vartheta_2$

Történet

Westhym ~~Hutten~~ eltérések nagyobbak mint 20 percent

Hagen eltérések középérték 5 értékből lett 6 percent

Formulák a kiszámitáshoz.

$$\frac{1}{\varrho_1}+\frac{1}{\varrho_2}=\frac{2z}{a^2}$$

z lefelé positiv

ϱ positiv ha a felület domború.

Végtelenbe terjedő hengerfelület.

horizontalisan észlelve $a=\pm\dfrac{z_1-z_2}{\sqrt2\left(\sin\frac{\vartheta_2}{2}-\sin\frac{\vartheta_1}{2}\right)}$ $\quad\sqrt2\left(\sin\frac{\vartheta_2}{2}-\sin\frac{\vartheta_1}{2}\right)$

verticalisan észlelve $a=\pm\dfrac{x_1-x_2}{\sqrt2\left(\cos\frac{\vartheta_1}{2}-\cos\frac{\vartheta_2}{2}+1{,}1513\log\frac{tg\frac{\vartheta_1}{4}}{tg\frac{\vartheta_2}{4}}\right)}$

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felület két párhuzamos lemez között

$$z_1^2-z_2^2=a^2(\cos\vartheta_2-\cos\vartheta_1)$$

Cseppekre. melyeknél z positiv

$$z=a\sqrt2\sin\frac{\vartheta}{2}\left\{1+\frac{a}{3\sqrt2 u_0}\frac{1-\cos^3\frac{\vartheta}{2}}{\sin^2\frac{\vartheta}{2}}+\frac{a^5}{\mu^2u^2u_0\pi\sqrt2^2 16}\frac{e^{\frac{u2\sqrt2}{a}}}{\sin^2\frac{\vartheta}{2}}\left(1+\frac{\sqrt2(u_0-u)}{a}\right)\right\}$$

reflectióval észlelve, ha a 3ik tag elhanyagolható:

$$a=\frac{z_1-z_2}{\sqrt2\left\{\sin\frac{\vartheta_1}{2}\left(1+\frac{a}{3\sqrt2u_0}\frac{1-\cos^3\frac{\vartheta_1}{2}}{\sin^2\frac{\vartheta_1}{2}}\right)-\sin\frac{\vartheta_2}{2}\left(1+\frac{a}{3\sqrt2u_0}\frac{1-\cos^3\frac{\vartheta_2}{2}}{\sin^2\frac{\vartheta_2}{2}}\right)\right\}}$$

A csepp Quincke szerint észlelve.

$$a=\frac{z}{1+\frac{a}{6u_0}(2\sqrt2-1)}$$

Poisson felület

Az érintkezési szögek kiszámitására szolgál a következő képlet

$$\delta\vartheta=\frac{4\sin\frac{\vartheta}{2}}{\cos\vartheta}\,\frac{\delta z}{a\sqrt2}$$

380
390
325
110

$$x=a\sqrt2\left(\cos\frac{\vartheta}{2}+\frac{1}{2}\lg tg\frac{\vartheta}{4}\right)$$

$$\frac{dx}{d\vartheta}=\frac{a\sqrt2}{2}\sin\frac{\vartheta}{2}+\frac{1}{8}\frac{1}{tg\frac{\vartheta}{4}\cos^2\frac{\vartheta}{4}}$$

$$+\frac{1}{4}\frac{1}{\sin\frac{\vartheta}{2}}$$

$$=a\sqrt2\left(-\frac{2\sin^2\frac{\vartheta}{2}}{2}+\frac{1}{4}\frac{1}{\sin\frac{\vartheta}{2}}\right)$$

$$\frac{a\sqrt2\cos\vartheta}{4\sin\frac{\vartheta}{2}}$$

$$\frac{a\sqrt2}{4\sin\frac{\vartheta}{2}}\left(-2\sin^2\frac{\vartheta}{2}+1\right.$$

$$\cos^2\frac{\vartheta}{2}-\sin^2\frac{\vartheta}{2}$$

$$z = \frac{a^2}{\mu\sqrt{2\pi\sqrt{2}}}\sqrt{\frac{a}{u}}\,e^{\frac{u\sqrt{2}}{a}}$$

$$\frac{dz}{du} = \frac{a^2}{\mu\sqrt{2\pi\sqrt{2}}}\left[-\frac{1}{2}\sqrt{a}\,e^{\frac{u\sqrt{2}}{a}}\cdot\frac{1}{u^{\frac{3}{2}}} + \sqrt{\frac{a}{u}}\,\frac{\sqrt{2}}{a}\,e^{\frac{u\sqrt{2}}{a}}\right]$$

ty ϑ $\quad \vartheta = \frac{a^2\sqrt{a}}{\mu\sqrt{2\pi u\sqrt{2}}}\,e^{\frac{u\sqrt{2}}{a}}\left(\frac{\sqrt{2}}{a} - \frac{1}{2u}\right)$

$$z^2 = \frac{a^5}{\mu^2 u\, 2\sqrt{2}\pi}\,e^{\frac{u2\sqrt{2}}{a}}$$

$$\vartheta^2 = \frac{a^5}{\mu^2 u\pi 2\sqrt{2}}\,e^{\frac{2u\sqrt{2}}{a}}\left(\frac{2}{a^2} - \frac{\sqrt{2}}{au}\right)$$

$$\frac{2a^2}{\mu^2 u\pi\sqrt{2}}\,e^{\frac{2u\sqrt{2}}{a}}\left(1 - \frac{a}{\sqrt{2}^2 u}\right)$$

$$z^2 = -a^2\cos\vartheta - \frac{2\sqrt{2}a^3}{3u_0}\cos^3\frac{\vartheta}{2} + C$$

$$z^2 = -a^2\left(1 - \frac{\vartheta^2}{2}\right) - \frac{2\sqrt{2}a^3}{3u_0}\left(1 - 3\frac{\vartheta^2}{8}\right) + C$$

$$z^2 = -a^2 + \frac{a^2}{2}\vartheta^2 - \frac{2\sqrt{2}a^3}{3u_0} + \frac{\sqrt{2}a^3}{4u_0}\vartheta^2 + C$$

$$\frac{a^5}{\mu^2 u\pi 2\sqrt{2}}\,e^{\frac{u2\sqrt{2}}{a}} + a^2 - \frac{a^5}{\mu^2 u\pi 2\sqrt{2}}\,e^{\frac{2u\sqrt{2}}{4}}\left(1 - \frac{a}{u\sqrt{2}}\right) + \frac{2\sqrt{2}a^3}{3u_0} + \frac{a^6}{4\pi u u_0\mu^2}\,e^{\frac{2\sqrt{2}u}{a}}\left(1 - \frac{a}{\sqrt{2}u}\right)$$

$$z^2 = 2a^2\sin^2\frac{\vartheta}{2} + \frac{2\sqrt{2}a^3}{3u_0}\left(1 - \cos^3\frac{\vartheta}{2}\right) + \frac{a^5}{\mu^2 u\pi 2\sqrt{2}}\,e^{\frac{u2\sqrt{2}}{a}}\left[\frac{a}{u\sqrt{2}} - \frac{a}{u_0\sqrt{2}} + \frac{a^2}{2uu_0}\right]$$

$$z = \pm a\sqrt{2}\sin\frac{\vartheta}{2}\left[1 + \frac{a}{3\sqrt{2}u_0}\,\frac{1-\cos^3\frac{\vartheta}{2}}{\sin^2\frac{\vartheta}{2}}\right.$$

$$z = \pm a\sqrt{2}\sin\frac{\vartheta}{2}\left\{1 + \frac{a}{3\sqrt{2}u_0}\,\frac{1-\cos^3\frac{\vartheta}{2}}{\sin^2\frac{\vartheta}{2}} + \frac{a^4}{\mu^2 u\pi 8\sqrt{2}}\,e^{\frac{u2\sqrt{2}}{a}}\left[\frac{1}{u\sqrt{2}} - \frac{1}{u_0\sqrt{2}} + \frac{a}{2uu_0}\right]\frac{1}{\sin^2\frac{\vartheta}{2}}\right\}$$

~~$z = \pm a\sqrt{2}\sin\frac{\vartheta}{2}$~~

$$z = \pm a\sqrt{2}\sin\frac{\vartheta}{2}\left\{1 + \frac{a}{3\sqrt{2}u_0}\,\frac{1-\cos^3\frac{\vartheta}{2}}{\sin^2\frac{\vartheta}{2}} + \frac{a^5}{\mu^2 u_0^3\pi 16\sqrt{2}}\,\frac{e^{\frac{u2\sqrt{2}}{a}}}{\sin^2\frac{\pi}{2}}\right\}$$

2,4

$\vartheta = \frac{\pi}{2}$

$$z = \pm a\left\{1 + \frac{a}{3\sqrt{2}u_0}\,\frac{2\sqrt{2}-1}{\sqrt{2}} + \frac{a^5\sqrt{2}}{16\pi u_0^3\mu_r^2}\,e^{\frac{u2\sqrt{2}}{a}}\right\}$$

$\frac{1-\frac{1}{2}\sqrt{\frac{1}{2}}}{\frac{1}{2}}$ 2,8

$u_0 = 12$

$\frac{a\cdot(2\sqrt{2}-1)}{6u_0}$ + 0,06

2 − $\frac{1}{\sqrt{}}$

2,4

$$z = \pm a\sqrt{2}\sin\frac{\vartheta}{2}\left\{1 + \frac{a}{3\sqrt{2}u_0}\,\frac{1-\cos^3\frac{\vartheta}{2}}{\sin^2\frac{\vartheta}{2}} + \frac{a^4}{\mu^2 u\pi 8\sqrt{2}}\,e^{\frac{u2\sqrt{2}}{a}}\cdot\frac{(u_0-u)\sqrt{2}+a}{2uu_0}\,\frac{1}{\sin^2\frac{\vartheta}{2}}\right\}$$

$$+ \frac{a^4}{\mu^2 u^2 u_0\pi 16\sqrt{2}}\,\frac{(u_0-u)\sqrt{2}+a}{\sin^2\frac{\vartheta}{2}}\,e^{\frac{u2\sqrt{2}}{a}}\Bigg\}$$

$\frac{\vartheta}{2} = 45$

$$z = \pm a\left\{1 + \frac{a}{3\sqrt{2}u_0}\right.$$

$$= \pm a\left\{1 + \frac{a}{6u_0}(2\sqrt{2}-1) + \frac{a^4}{\mu^2 u^2 u_0\pi 16}\left\{2(u_0-u) + a\sqrt{2}\right)e^{\frac{u2\sqrt{2}}{a}}\right\}$$

0,05714

$a = 2,35$

$u_0 = 14$

$u = 12$

$\mu = 2840$

konvex felületen pontra z felfelé pontja

$$z = \alpha + \frac{a^2}{\mu} - \frac{a^2}{\mu\sqrt{2\pi\sqrt{2}}}\sqrt{\frac{a}{t}}\, e^{\frac{\pm\sqrt{2}}{a}}$$

e a Neper féle logaritmussal kapcsolatban.

$$\boxed{z = \alpha - \frac{t^2}{2\mu}}$$

$$e = 2{,}7182183$$

$$\log \text{nat}\, e = 0{,}4342944\,8$$

$$\frac{2}{\mu} = -\frac{2z'}{a^2}$$

$$z' = -\frac{a^2}{\mu}$$

$$z = \alpha$$

$$z' - z = -\frac{a^2}{\mu} - \alpha$$

$$z' = e - \frac{a^2}{\mu} - \alpha$$

$$z = \frac{a^2}{}$$

16

6,4

64

107 =

10 m

$$z = \frac{a^2}{\mu\sqrt{2\pi\sqrt{2}}}\sqrt{\frac{a}{u}}\,e^{\frac{u\sqrt{2}}{a}}$$

$$\frac{dz}{du} = \frac{a^2}{\mu\sqrt{2\pi\sqrt{2}}}\left\{\sqrt{\frac{a}{u}}\cdot\frac{\sqrt{2}}{a}\,e^{\frac{u\sqrt{2}}{a}} - \frac{1}{2}\frac{\sqrt{a}}{u^{\frac{3}{2}}}\,e^{\frac{u\sqrt{2}}{a}}\right\} = \frac{a\sqrt{a}}{\mu\sqrt{u}\sqrt{\pi\sqrt{2}}}\,e^{\frac{u\sqrt{2}}{a}}\left(1-\frac{a}{2\sqrt{2}\,u}\right)$$

$$\left[\; z^2 = \frac{a^5}{\mu^2 u\, 2\pi\sqrt{2}}\,e^{\frac{u2\sqrt{2}}{a}}\right.$$

$$\left[\; \vartheta^2 = \frac{a^3}{\mu^2 u^3 \pi\sqrt{2}}\,e^{\frac{u2\sqrt{2}}{a}}\left(1-\frac{a}{\sqrt{2}u}\right)\right. \qquad \text{skoyagulva } \frac{a^2}{8u^2}$$

$$z^2 = -a^2\cos\vartheta - \frac{2\sqrt{2}\,a^3}{3u_0}\cos^3\frac{\vartheta}{2} + C'$$

ka ϑ kicinj. ~~$\cos\vartheta = 1-\frac{\vartheta^2}{2}$~~ $\qquad \cos^3\frac{\vartheta}{2} = \left(1-\frac{\vartheta^2}{4}\right)\left(1-\frac{\vartheta^2}{8}\right) = 1-\frac{\vartheta^2}{8}-\frac{\vartheta^2}{4} = 1-\frac{3}{8}\vartheta^2$

$$z^2 = -a^2\left(1-\frac{\vartheta^2}{2}\right) - \frac{2\sqrt{2}\,a^3}{3u_0}\left(1-\frac{3}{8}\vartheta^2\right) + C$$

$$z^2 = -a^2 + a^2\frac{\vartheta^2}{2} - \frac{2\sqrt{2}\,a^3}{3u_0} + \frac{\sqrt{2}\,a^3}{4u_0}\vartheta^2 + C$$

$$\frac{a^5}{\mu^2 u\, 2\pi\sqrt{2}}\,e^{\frac{u2\sqrt{2}}{a}} = -a^2 + \frac{a^5}{\mu^2 u\,\pi\, 2\sqrt{2}}\,e^{\frac{u2\sqrt{2}}{a}}\left(1-\frac{a}{\sqrt{2}u}\right) - \frac{2\sqrt{2}\,a^3}{3u_0} + \frac{a^6}{\mu^2 4u u_0\pi}\left(1-\frac{a}{\sqrt{2}u}\right)e^{\frac{2\sqrt{2}u}{a}}$$

$$z^2 = a^2 2\sin^2\frac{\vartheta}{2} + \frac{2\sqrt{2}\,a^3}{3u_0}\left(1-\cos^3\frac{\vartheta}{2}\right) + \frac{a^5}{\mu^2 u\,\pi\, 2\sqrt{2}}\,e^{\frac{u2\sqrt{2}}{a}}\left(1-1+\frac{a}{\sqrt{2}u}-\frac{a}{\sqrt{2}u_0}+\frac{a}{\sqrt{2}u_0}\left(1-\frac{a}{\sqrt{2}u}\right)\right)$$

$$\frac{a}{\sqrt{2}u} - \frac{a}{\sqrt{2}u_0} - \frac{a}{\sqrt{2}u_0} + \frac{a^2}{2uu_0}$$

$$z^2 = 2a^2\sin^2\frac{\vartheta}{2}\left\{1 + \frac{\sqrt{2}\,a}{3u_0}\,\frac{1-\cos^3\frac{\vartheta}{2}}{\sin^2\frac{\vartheta}{2}} + \frac{a^3}{\mu^2 u\,\pi\,4\sqrt{2}}\,e^{\frac{u2\sqrt{2}}{a}}\left(\frac{a}{\sqrt{2}u}-\frac{a}{\sqrt{2}u_0}+\frac{a^2}{2uu_0}\right)\right\}^1$$

$$+ \frac{a^5}{\mu^2 u^2 u_0\,\pi\, 8\sqrt{2}}\,e^{\frac{u2\sqrt{2}}{a}}\left(\sqrt{2}u_0 - \sqrt{2}u + 1\right)$$

$$z = a\sqrt{2}\sin\frac{\vartheta}{2}\left\{1 + \frac{a}{3\sqrt{2}u_0}\,\frac{1-\cos^3\frac{\vartheta}{2}}{\sin^2\frac{\vartheta}{2}} + \frac{a^5}{\mu^2 u^2 u_0\,\pi\, 16\sqrt{2}}\,\frac{e^{\frac{u2\sqrt{2}}{a}}}{\sin^2\frac{\vartheta}{2}}\left(1+\frac{\sqrt{2}(u_0-u)}{a}\right)\right\}$$

δ_2

~~$\sin \frac{\delta_2}{2} = \sin 2^\circ 40' 13'' = 0,4123670$~~

$2 \sin \frac{\delta_1}{2} = \sin 1^\circ 39' 6'' = 0,0288231$

~~$\sin \frac{\delta_2}{2} = \sin 41^\circ 34' 2\frac{1}{2}'' = 0,6635000$~~

0,0287940
29076
48.96288231

0,4123096
574
670

$\sin \frac{\delta_3}{2} = \sin 41^\circ 34' 2\frac{1}{2}'' = 0,6635000$

$2 \sin \frac{\delta_2}{2} = \sin 20^\circ 38' 46'' = 0,3525949$

0,0523862
2087
0,0525949

44,15
17
1245
1415
5755

4527
46
27222
18148
2087

0,3525949
0288231
0,3237718

tg 0,3109051 = 0,4926277 − 1
150515 0
0,6431427

tg N_{23}
$N_{23} = 0,40969$

tg 0,3237718 = 0,5102066 − 1
150515 0
0,6607516

tg $N_{12} = 0,6607516$
$N_{12} = 0,45788$

260,5	251
264	252
260	252,5
267	254
264,5	254
264	255,5
266	256
269	255
269	256
267	255
265,4	254,2

$\frac{3}{8}$

2
1
2
2
1,5
1
1
1
1,5
1,5
2
1,5
0,5
1
2
1
2
1
0
1
1
0,5
=

30/28/0,933
10/10 30,93

~~$\sin \frac{\delta_5}{2} = \sin 37^\circ 32' 59'' = 0,6094497$~~

$\sin \frac{\delta_5}{2} = \sin 37^\circ 32' 59'' = 0,6094497$

$\lg 1{,}327 = 0{,}1228709$

$0{,}6607516 - 1$ a_{12} $2{,}8981$

$0{,}4621193$

$\lg 1271 = 0{,}1041456$

$6431427 - 1$ a_{23} $2{,}8907$

$0{,}4610029$

a_{34}

~~$0{,}4900720$~~

$0{,}15466$ ~~1892095~~

1893780

$\lg$ $2{,}5080$

$0{,}1893949 - 1$

$0{,}7900712 - 2$

$0{,}3993237$

0,1193 ~~0,02114~~

0,1193 | ~~0,02213~~2

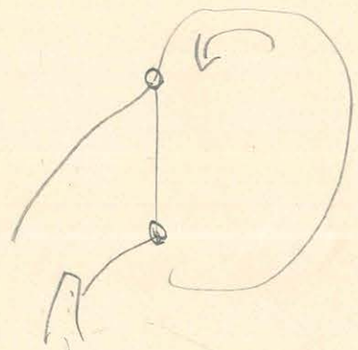
221 | 1193 | 5,4 $-\frac{4}{221}$

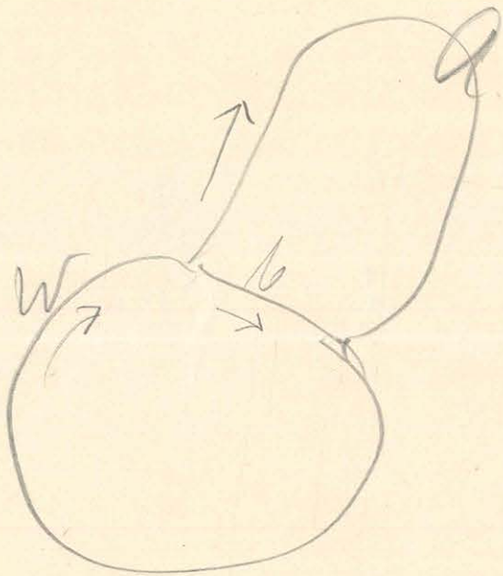
1105

880

3 | 16,2 | 5,4

12





$i_w = i_a + i_b$ $\quad i_w - i_b$

$a.i_a - b i_b = e$

$W i_w + b i_b = \mathcal{E}$

$a_{i_w} - a_{i b} - b_{i b} = e$

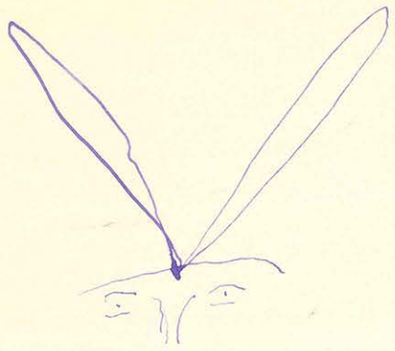
~~a i~~ a_i $a i_w - a_i i_b - b_{i b} = e$

$= 1'0$

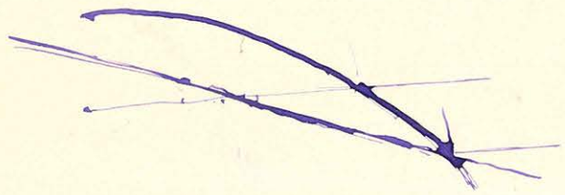
$\frac{6_{01}}{{}_{8}01} - \frac{01}{1}$

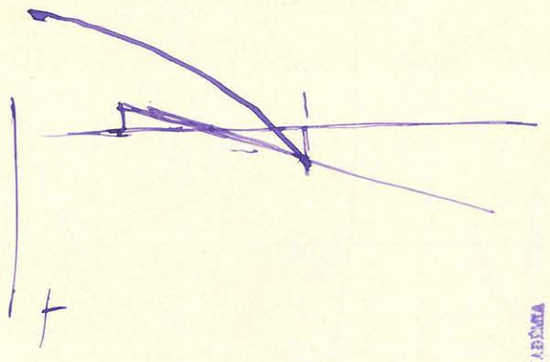
$a i_w + (a+b) i_b = e$ $\quad i_b = \frac{\mathcal{E}}{b} - \frac{W}{b} i_w$

$a i_w - (a+b)\frac{\mathcal{E}}{b} + \frac{a+b}{b} W i_w = e$



che cosa è?





$$t - t_0 + \tau_0 - \tau = (\lambda - \lambda_0)\,\varepsilon$$

$$t - \tau = (\lambda - \lambda_0)\,\varepsilon$$

$$t + \varepsilon\frac{\partial t}{\partial \varepsilon}\delta\varepsilon - \tau - \frac{\partial \tau}{\partial \varphi}\delta\varepsilon = (\lambda - \lambda_0)\delta\varepsilon + \frac{d\lambda}{d\varphi}\delta\varepsilon\,(\lambda - \lambda_0)$$

$$\frac{\partial t}{\partial \varepsilon} = (\lambda - \lambda_0) + \frac{d\lambda}{d\varphi}\,\varepsilon$$

$$\lambda - \lambda_0 = \frac{d\varphi}{d\varepsilon}\,\varepsilon - \varepsilon\frac{d\lambda}{d\varphi}$$

$$(\lambda - \lambda_0)_0 = \left(\frac{d\varphi}{d\varepsilon}\right)_0$$

$$\tau_0 - \tau = \lambda - \lambda_0 + (\lambda_0 - \lambda_0)\,\varepsilon - (t - t_0)$$

$$\tau_0 - \tau = \lambda - \lambda_0 + \left(\frac{d\varphi}{d\varepsilon}\right)_0\varepsilon - \varepsilon\left(\frac{d\varphi}{d\varepsilon}\right)_0$$

$$\tau_0 - \tau = \lambda - \lambda_0$$

$$\frac{\partial \varphi}{\partial \varepsilon}\,\varepsilon = \tau_0 - \tau$$

$$\sin\varphi\cos\varphi = 1$$

$$\tau_0 - \tau = \frac{1}{2}\sin\varphi$$

$$\frac{\partial \varphi}{\partial \varepsilon}\,\varepsilon$$

$$\varphi - \frac{\pi}{2}$$

$$\varphi + \frac{\pi}{2} - \varphi + \varphi$$

$$\varphi - \frac{\pi}{2} = \varepsilon$$

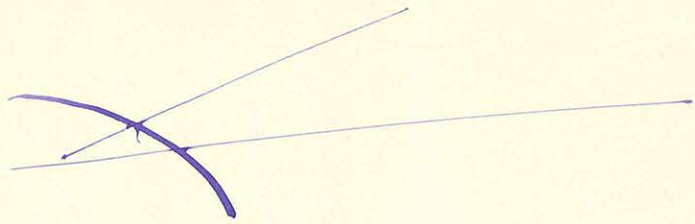
$$\varphi = \frac{\pi}{2} + \varepsilon$$

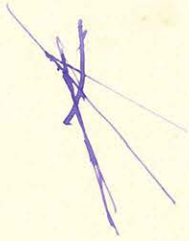
$$\rho\cos\varphi = \rho\cos(\varepsilon - \alpha)$$

$$\rho\sin\varphi = \rho\sin(\varepsilon - \alpha)$$

$$\rho\varphi = \rho\varepsilon - \rho\left(\frac{\pi}{2} - \varphi\right)\varepsilon$$

$$\frac{d\rho}{d\varphi}$$





$t - \tau = (1-\lambda)\varepsilon$ $\quad$ ε a ξ ε hugyan.

$$\frac{dt}{dp} - \frac{d\tau}{dp} = (1-\lambda) + \varepsilon \frac{d\lambda}{dp} - \varepsilon \frac{\partial \lambda}{\partial p}$$

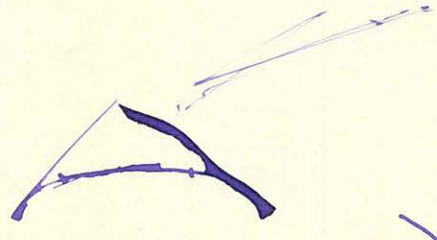
$$t + \frac{\partial t}{\partial p}\delta\varepsilon - \tau = \lambda\varepsilon + \frac{\partial \lambda}{\partial p}\delta\varepsilon$$

$(\tau_0 - \tau) = \varepsilon(1-\lambda_0)$

$\frac{\partial p}{\partial p_2} = 0$ $\quad$ $t - t_0 = \tau - \tau_0$

$$\frac{\partial t}{\partial p}\delta\varepsilon + \frac{\partial p}{\partial p} = \frac{dp}{dp}$$

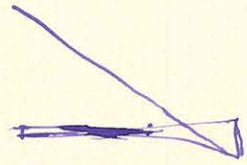
$\frac{dp}{dt} = \frac{dp}{d\lambda}$

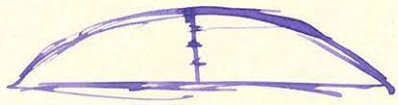


$\lambda - \lambda_0 = \frac{\tau - \tau_0}{1 - \lambda_0}\varepsilon$

$t - t_0$

$\tau - \tau_0$

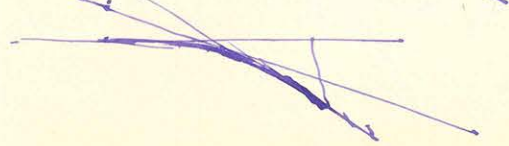


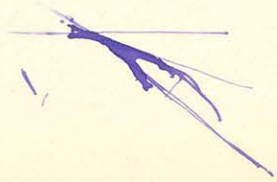


$1 - \cos\varepsilon$ $\quad$ $\sin^2\frac{\varepsilon}{2}$

$\sin\varepsilon$ $\quad$ $\frac{\varepsilon^2}{4}$

$y = \varepsilon$ $\quad$ $x = \frac{\varepsilon^2}{4}$





$$\tau - \tau_0 = \varepsilon^2 \frac{a}{2\sqrt{2}} \frac{\cos\frac{\delta}{2}}{\sin\frac{\delta}{2}}$$

0°	—	∞
1°	—	114,9
2°	—	57,1
3°	—	38,1
4°	—	28,5
5°	—	22,9
10°	—	11,3
20°		5,67
30°	—	3,4
40°	—	2,2
50°	—	1,5
60°	—	1,0
70°	—	0,6
80°	—	0,27.
90°	—	0

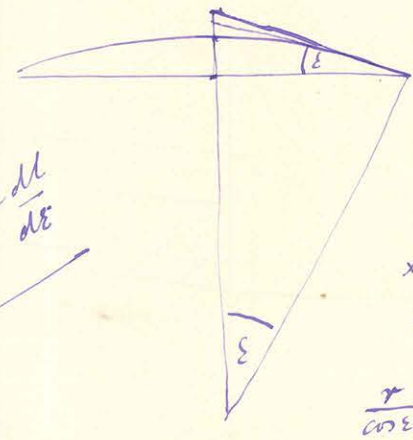
$$z = a\sqrt{2}\sin\frac{\delta}{2}$$

$$\frac{d\delta}{dz} = \frac{1}{z}$$

$$\frac{dz}{d\varepsilon} = \frac{a\sqrt{2}}{2} = \frac{1}{2}\frac{a}{\sqrt{\varepsilon}}\cos\frac{\delta}{2}$$

$$\frac{d^2z}{dz^2} = -\frac{1}{8}\frac{a}{\sqrt{\varepsilon}}\sin\frac{\delta}{2}$$

$$\tau - \tau_0 = \frac{3\varphi}{2}\varepsilon^2\frac{d\varphi}{d\varepsilon}$$



$$r = 3\omega x$$

$$x = \frac{r}{3\omega}$$

$$r - \frac{3\omega r}{3\omega}$$

$$\frac{r(1-\cos\varepsilon)}{\cos\varepsilon}$$

$$\tau = r(1-\cos\varepsilon)$$

$$\frac{3\omega}{2}$$

$$\frac{14}{180}$$

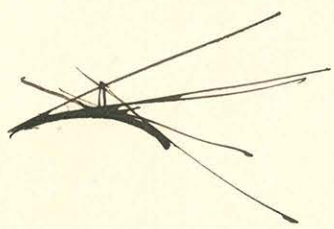
$$\frac{1}{12} : \frac{1}{150} \quad \frac{2,5}{2,8}$$

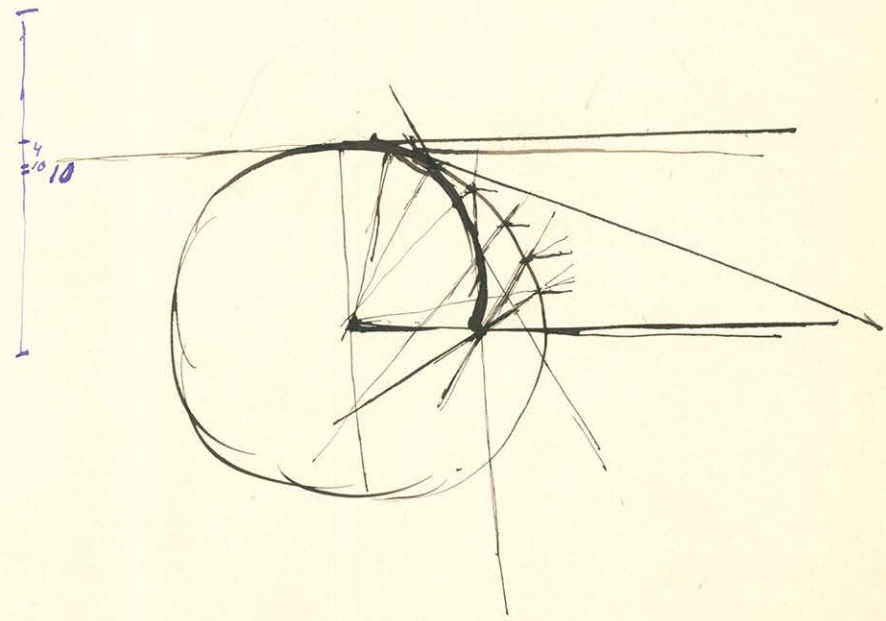
$$\frac{28}{170}$$

$$\begin{array}{r} 28 \\ 14 \\ \hline 42,0 \\ 25,0 \\ \hline 17,0 \end{array} \Big| \begin{array}{l} 14 \\ \hline 29 \\ 170 \end{array} \Big| 2$$

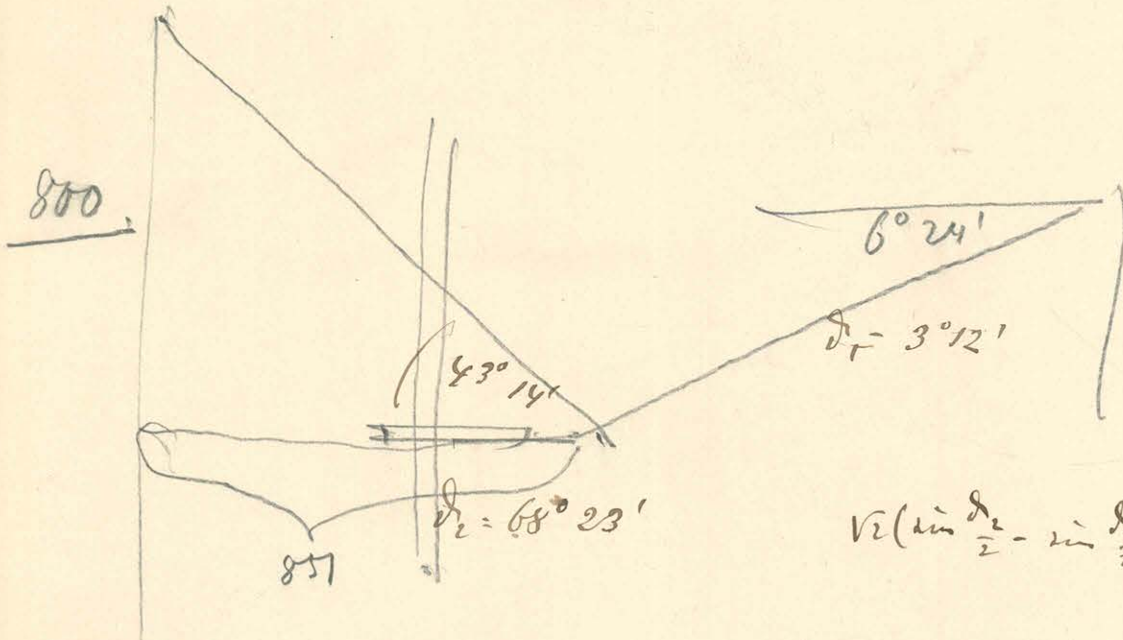
$$\varepsilon \quad 1000$$

$$\frac{01}{3}$$





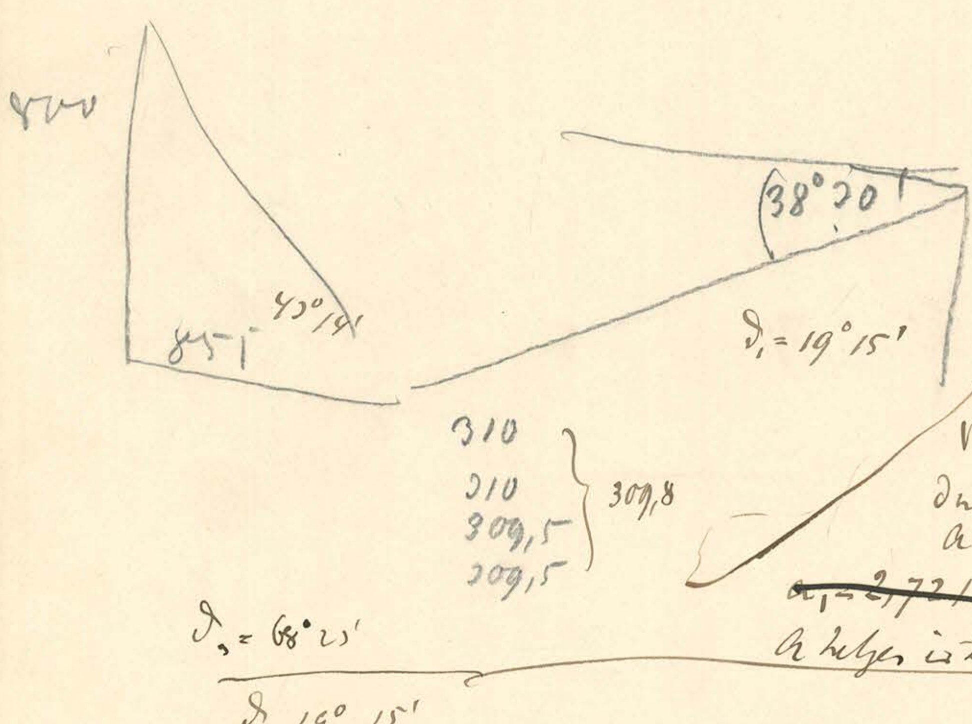
April. 29 a régi állás [illegible]



$\sqrt{2}\left(\sin\frac{\vartheta_2}{2} - \sin\frac{\vartheta_1}{2}\right) = 0{,}75527$

420
419,5
419
420 } 419,6 a durva = 2,778

Más beállítás.



Ugyanaz Máj 7 ikén 309.

310
310
309,5
309,5 } 309,8

$\sqrt{2}\left(\sin\frac{\vartheta_2}{2} - \sin\frac{\vartheta_1}{2}\right) = 0{,}55828$

durva $a = 2{,}775$

~~$a_1 = 2{,}771$ $a_2 = 2{,}722$ $a_2^2 = 7{,}4103$~~

a helyes érték = 2,684

$\vartheta_3 = 68^\circ 23'$

ϑ_2 $19^\circ 15'$

$\vartheta_1 = 3^\circ 12'$

$\sqrt{2}\left(\sin\frac{\vartheta_2}{2} - \sin\frac{\vartheta_1}{2}\right) = 0{,}19699$

419,6
309,8
109,8 a durva = 2,787.

$a_1 = 2{,}6779$

$a_2 = 2{,}6821$ $a_2^2 = 7{,}1937$

Ms 5098 /29

1885

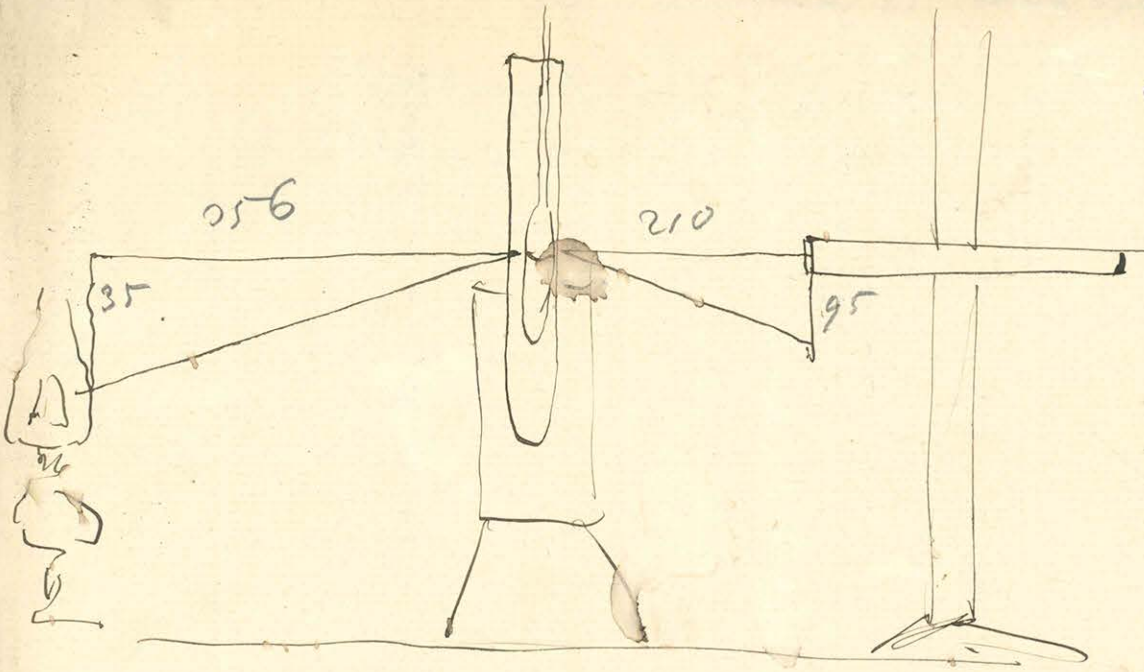
Ivy

Folyadékok felszíni

feszültsége

1885 Aug. 15

I



Akad. formulából véve

$a_{21} = 3,828$

$a_{22} = 3,824$

$a_{23} = 3,820$

$a_{24} = 3,816$

$a_{25} = 3,813$

Kiint körülbelül 28 m.m. [illegible] kiszorításakor [illegible] lett [illegible]

belső átmérő 27. így $r = 13,5$ m.m.

Temperatura ~~[illegible]~~ $24,5^0$

730	730	[illegible]	731
730	730,5	[illegible]	730
731	731		etc.
730,5	730,5		
729	730,5		
	közép 730,2		

Temperatura $24,5^0$

$z' - z = 3,652$

Forr a víz Temp. 99^0 Thermometer bemerült 20ig

kivül 97–98

~~668~~

e.i. 672

n.i. 669

e.i. 673

n.i. 672

e.i. 674

n.i. 673

e.i. 674

n.i. 670

e.i. 672

n.i. 669

közép 671,8

Corrigált temperatura

Temperatura 98^0

$z' - z = 3,359$

~~[illegible]~~

Forr 98 nál kivül 96 ig

$\xi/h =$ [illegible]

~~a_{98}~~ $\frac{a_{98}}{a_{24,5}} = \frac{\xi_{98}}{\xi_{24,5}} = 0,91977.$

$a_{98} = 3,508$

Nota B. az akad. formulából $a_{98} = 3,520$

$\xi/h = 0,2488$

$a_{98} = 3,520$

Temp. 24,5

727
727
727,5
727
727
727
728
727
725
728 — Temp. 24,5

Kreis 727

Temp. 24,5
$z'-z = 3,635$

Thermometer kann über 35 steigen

Temp. 67,4

697 -0,5 696,5 } 67,4
+1 698 } 67,1
-1 696 67
-1,5 695,5
-1,5 695,5
-1,5 695,5
-0,5 696,5 67,1
+1 698
+2 699 } 67,1
+1 698 } 68
+2 699
+2 699 } 68

697,2

Temperatur 67,5
$z'-z = 3,486$

$\frac{a_{67,5}}{a_{24,5}} = \frac{\zeta_{67,5}}{\zeta_{24,5}} = 0,9582$

$a_{67,5} = 3,655$

$a_{66,5} = 3,659$

$\frac{\zeta}{n} = 0,2892$ $a_{67,5} = 3,660$

$a_{66,5} = 3,664$

Temp. 24,5

729
730
727
727
730
728

728,5

Temp.

Temp. 24,5

$z'-z = 3,642$

Kreis ϕ in I) 671

$z'-z = 3,638$

Chlorcalciumban gyengítésnél

Kis thermometer 25 hosszú thermometer 26

A thermometer 130°ig van benn.

~~734~~	Temp. 25
734	$z' - z = 367$
735	
734	
733	
734	
736	
735	
734	
733,5	
733,5	
738	

Gőzzel Chlorcalciumban

Temperatúra a hosszú thermometeren az egészen benn van egy oldatban

		Temp.	
	653	126 − 125	125,5
	651	126 − 125	125,5
	648	126 − 125	125,5
	648	126 − 125	125,5
	650	126 − 125	125,5
12 −25	652	126 − 125	125,5
45	651,5	126 − 124	125
650,4	649	126 − 124	125
	651,5	126 − 124	125
	650,5		

Temp. 125,4

$z' - z = 325,2$

$\frac{a_{125,4}}{a_{25}} =$ ~~0,8820~~ 0,8861

$a_{125,4} = \frac{a}{3} = 3,379$

$\frac{a}{a} = 0,2409$

$a_{125,4} = 3,408$

Segédmérések

Körülbelül 40 m.m. külső átmérőjű kisdobok mérése.

Temp. 24	719,5	719	
	720	719	
	718	714,5	
	~~716~~	718	
	720,5		
	720	719	Temp. 24,5

~~másik cső körülbelül 28,4~~

706	707	
706	707	Temp. 24
706,5	707	
705,5	707	
704,5	705,5	

Újabb észlelések 22°-kal vízzel

$u = 13,5 \qquad \xi = 3,607 \qquad | \quad a = 3,824$

$u = 15,0 \qquad \xi = 3,651 \qquad | \quad a = 3,824$

e szerint

$\frac{\xi}{u} = 0,2694 \quad - \quad \frac{a}{\xi} = 1,0513$

$\frac{\xi}{u} = 0,2287 \quad - \quad \frac{a}{\xi} = 1,0474$

evvel számítva a körülbelül 28 millimeteres csőből lesz

összehasonlítás a 40 millimeteresből

$a_{98} = 3,520$	$a_{98,5} = 3,515$
$a_{66,5} = 3,660$	$a_{66,5} = 3,657$
$a_{125,4} = 3,408$	$a_{125,2} = 3,406$

Nagyszerű

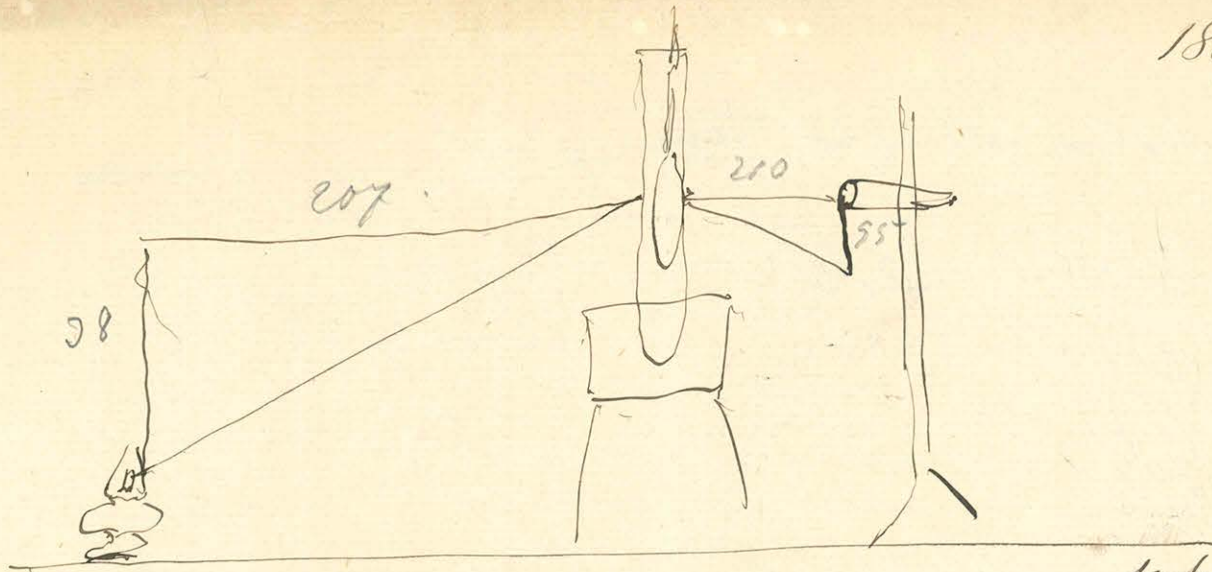
t	T	p	ρ	p²	$\frac{p^2 T}{1000 \rho^3}$	megfelelő t'	T'	$\frac{T}{T'}$
-2°7	270,3	3,75	454,7 ~~470,7~~	14,06	0,00526			
24°	297	22,1	383,0	488,4	0,379			
66°5 (273)	339,5	200,1	281,1	40040	48,45			
98°5 (273)	371,5	720,0	~~351,0~~ 208,0	518400	924,6	-2,5	270,5	1,373
125°2 (273)	398,2	1755	159,2	3080000	7710	+17.	290	1,372

} vízre T" 362,7.

Mérve p	$\frac{p}{\rho'}$	$\frac{M}{S} \frac{p}{\rho}$	
-2,5 = 165	4,36	72,7	+1,5
+17 = 382	4,60	116,5	+12,5

1885 Aug. 15

II



Kiült kimutatott 40 mm átmérőjű kapcsolt eggyel telt cső
pontos méréseitől szerint $u = 18{,}7$.

Vízben Temp. 23,5

Temp. 23,5
$z' - z = 3{,}570$

714	714,5
714,5	714,5
714,5	713,5
713	713
713	715

Közép = 71405 $z' - z = 3{,}570$

Forralva a víz a thermometer 99,0 lenne van a vízben ~~10~~ 10 fokig

minden egyes mérés között újra forralva hogyha lehűlt 98 fokra

98,0 correctióval a közép forralva

c.i 655
m.i. 652
c.i. 655
m.i. 653
655
m.i. 655
655
655
654

Közép ~~652~~ 653,9

Temp. ~~99~~ 98,5
$z' - z = 32695$
$= 3{,}270$

$$\frac{a_{98,5}}{a_{23,5}} = \frac{\xi_{98,5}}{\xi_{23,5}} \cdot \frac{1 + \frac{1}{3}\frac{a_{23,5}}{u}}{1 + \frac{1}{3}\frac{a_{98,5}}{u}}$$

Ebből $a_{23,5} = 3{,}818$ | $a_{98,5} = 3{,}506$ $u = 18{,}7$ értékkel számítva

$$\frac{a_{98,5}}{a_{23,5}} = 9{,}2062$$

és $a_{98,5} = 3{,}515$

redukálva 98°ra = 3,517

Alkoholos étherbe tevé.

Temperatura 22,6

Temp. 22,6

$z'-z = 3,535$

708	+1
707	0
708	+1
707	0
707	0
707	0
706,5	−0,5
706	−1
708	+1
706,5	−0,5

közép 707,1

Alkoholos ether forralva — Teljesen nem kiálló rész.

Temp. 66,5

$z'-z = 3,376$

T.		
66,5	674	T = 66,5
	675	
65,6	675,5	65,8
	676,5	
65,4	677	− 65,4

Újra melegítve

67,5	674	T = 67,5
	673,5	67,5
67	675,5	67
	674,5	
66,5	677	66,5
	675	

közép = 675,2

Úgy számítva mint 99°-ra. hűtési együttes $\alpha_{67} = 3,68$

$$\frac{a_{66,5}}{a_{22,8}} = 0,95699$$

$a_{66,5} = 3,657$

(Abs. adat finom $a_{66,5} = 3,654$)

3 órával később letéve

Temp. 23,4

Temp. 23,4

$z'-z = 3,538$

708
707
708
707,5

elég

707,6

I) Φ és Obst adatokkal: közép temperatura = 22,8; közép $z'-z = 3,536$

Chlorcalcium oldatába téve.

~~Chlorca~~ Temp. rövid Therm 25,5 hosszú Therm. 26,4

-717
-717,1
-717
-716
-716
-716
715,5
717
717 közép 716,5
-716,5

Temp. 25,4
$z'-z = 3,582$

Jurvalum 125-125,5

			Temp
+125	-1	633	125
		~~641~~	~~125~~
+126		635	126 -126
+125,5	-0,5	636	126 - 125
+127	+1	636	128 - 126
126,5	+0,5	632	127 - 126
+127	+1	634	128 - 126,5
+127	+1	633	128 - 126
+127	+1	632	128 - 126
+127	+1	632	128 - 126
+127		631	128 - 126

leolvasás a hosszú Thermometeren

a fejrudak jártja 60°-nál

Temperatura a rövid thermometeren mindig 125°C.

Temp. 125,2
$z'-z = 3,165$ korábbi $a_{125} = 3,38$

$$\frac{a_{125,2}}{a_{24,8}} = \frac{\xi_{125}}{\xi_{25}} \cdot \frac{1+\frac{1}{3}\frac{a_{25}}{n}}{1+\frac{1}{3}\frac{a_{125}}{n}} = 0,8897$$

$a_{125,2} = 3,392$

Kissé el lett a cső tolva.

127	+1	631,5	128 - 126,5
127	+1	631,5	128 - 126
127	+1	632,5	127 - 127
126,5	+0,5	632,5	127, 125,5
közép 126,7		k. 633	

akad. formula adja
NB. $a_{125,2} = 3,406$

Lehűtve 23°C rövid thermometer

718
717
717
716,5
717,1

~~Temp~~ 23,2
$z'-z = 3,586$

közép $\S$ és $\ddagger$ ből

$$\text{Temp.} = \frac{4 \times 23,2 + 10 \times 25,4}{14}$$

Temp. = 24,8
$z'-z = 3,583$

$u = 13{,}5 \quad a = 3{,}824 \quad \xi = ~~368{,}7~~ = 3{,}637$

$15{,}0 \quad a = 3{,}824 \quad \xi = 3{,}651$

$\frac{\xi}{u} = 0{,}2694 \qquad \frac{a}{\xi} = 1{,}0513$

$\frac{\xi}{n} = 0{,}2387 \qquad \frac{a}{\xi} = 1{,}0474$

3,9
30,5

13,5 | 3,637 | 0,2694
270
937
810
1,270
1,215
550

12,5 | 3252 | = 0,2409
270
552
540
1220

3637 | 3,824 | 1,0513
3637
18700
18185
5150
3637
15130

15,0 | 3651 | 0,2387
306
591
459
1320
1224
960
818

1,048
925,2
2096
5240
2096
9144
940 8096

3651 | 3,824 | 1,0474
3651
17300
14604
26960
25557
14.030

125 | 3652 | 27
270
952

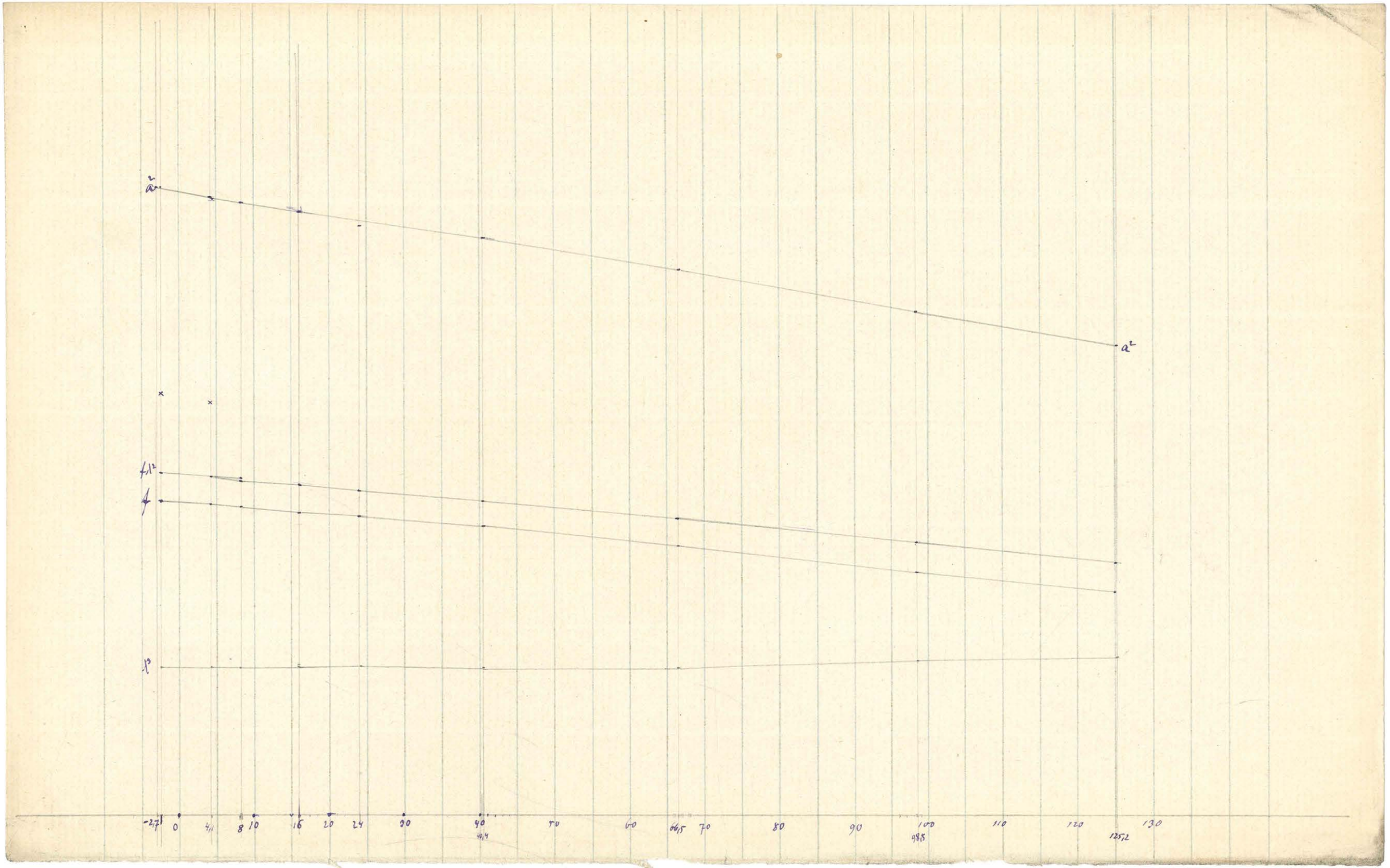
13,5 | 3,486 | 2582
270
786
675
1110
1080
300

125 | 3,359 | 2488
270
659
540
1190
1080
1100

3486
1,05
17430
34860
366030
3664

1,048
3359
9432
5240
3144
3144
3,520232

$\frac{\xi}{n} =$


a^2
$f/1^2$
f
1^0
-2,7
0
4,1
8
10
16
20
24
30
40
44,4
50
60
66,5
70
80
90
100
98,8
110
120
125,72
130

Vrban thermometer. $\delta = 67$.

18°C.

	599
	598
	597
	598
~~40~~	~~579~~
49°	583
48,5	582
48,4	580
48	581
47,5	582
47,4	583
47	582
46,5	581
46,5	582
46	582
47,49	
2°2	607
2°1	607
2	608
1,8	607
1°	609
1°	607
1°	608
1°	607
1°	607
9,1°	0,5608
	607,5

18° 598
47,5 581,8
2° 607.
25

16°ra 9
29,5°ra 16,2

16 : 9 = 29,5 : 16,2

16,2
16
738
162
2952

2655

45 | 250 | 0,555

Kulső mód
1/pohár
Ismerni

160 | 29,5 | 0,542

Hangya

Thermomet

100
80

Маш. нагр 10°

601
602
601
605
601
602
601,5
605
601,5
602

601,8

69,5° 574
~~68,0~~ 570
68,2° 570
570
67,3° 569
571
66,3° 570
569
65,5° 570
570

336,8

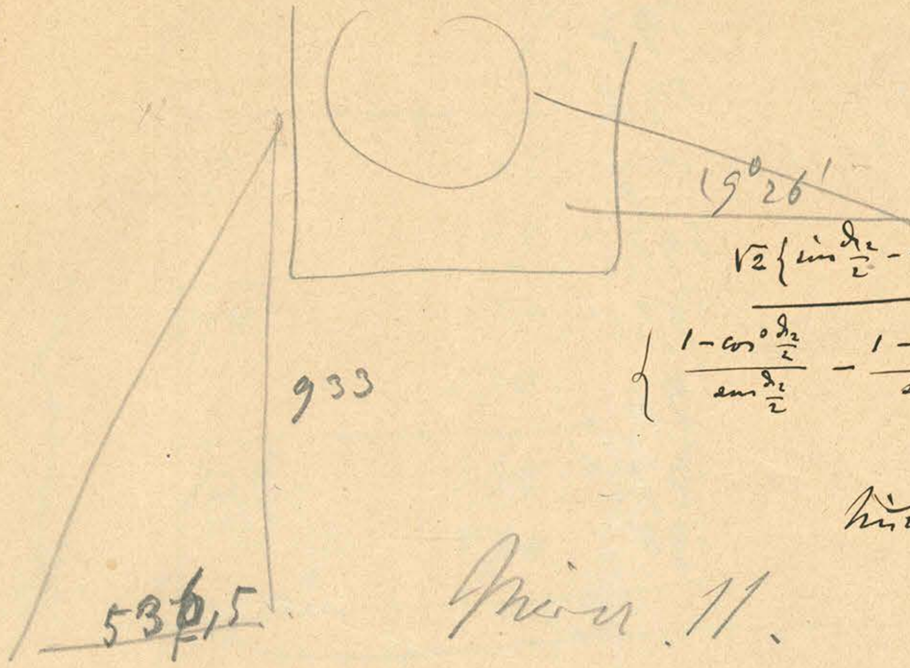
674

~~66,1~~

52,5° 577
578
57,8° 577
577
57,3° 579
578
50,5° 578
578
50,0° 579,5
579,8
49,5°

67°4 — 570

Kénsavsókban lehűtött víz



$\vartheta_1 = 3^\circ 30\tfrac{1}{4}'$

$\vartheta_2 = 69^\circ 43\tfrac{1}{4}'$

$\sqrt{2}\left\{\sin\frac{\vartheta_2}{2} - \sin\frac{\vartheta_1}{2}\right\} = 0{,}765095$

$\left\{\frac{1-\cos\frac{\vartheta_2}{2}}{\sin\frac{\vartheta_2}{2}} - \frac{1-\cos\frac{\vartheta_1}{2}}{\sin\frac{\vartheta_1}{2}}\right\} = 0{,}73719$

$u_0 = 65$

~~[illegible]~~

Márc. 11.

$-2{,}9^\circ$	613	
	614	
	614	
	614	
$=-2{,}7$	612,5	613,6
	613,5	
	613	
	614	
	613,5	
$-2{,}5$	614,5	

$+4^\circ$	609	
	609	
	608	845
	607,5	
$4^\circ 1'$	608,5	608,45
	608,5	
	609	
	608	
	609	
$+4{,}2$	608	

8°	606	606
	606	
	607	
	606	
	605	

A kénsav [illegible] vízzel felhígítva

8°	607	606,6
	606	
	607	
	605	
	608	

vides

24° 597
598
597
597
597
597,5
597,5
597
597
24° 598

597,3

41° 588
588
589
588,5
40°5 589
588,5
589,5
589
40° 589
588,5

588,7

15 km 9,5

57° 580
580
56° 579
578,5
55°5 578,5
579,5
55° 579
578
54,5 579,5
580
54,2

579,2

55,3

3322

55,3

77°	566	
	566	
76,2	567	
	567	
75	566	567,75
	568	
74,6 74°	569	[illegible] 11,5
	570	
73°	568,5	
	570	
72,5°		

447,7

74,6

a [illegible] [illegible] [illegible] [illegible] [illegible]

[illegible]

Lehűtés levegőben

57°	579,5	
	580	
56°	579	
	582	
55°	581	1905
54,6	580,5	581,05
54°	582	
	582,5	
53,5	582	
	581	
53		

328 5

54,6

41° 588

588

589

588,5

589

589,5

589,5

589,5

589

589,0

40° 3'

39,6

588,9

Mérve március 12-én

16° 601,5

601,5

601

601,5

602

601

602

602

602,5

601

16°

601,6

$a = 3,858$

	a	a^2	$\sqrt{\text{Spez. Volumen}}$	α	
−2,7	614,2	3,937	15,502	1,000391	7,748
					0,0186
+4°1	609,05	3,905	15,248	1	7,624
					0,0156
+8°	606,6	3,889	15,127	1,000116	7,563
					0,160
+16°	601,6	3,858	14,884	1,001004	7,435
					0,0153
+24	597,3	3,831	14,676	1,002644	7,319
					0,147
+40°4	588,8	3,777	14,268	1,007863	7,078
					0,170
+55°	580,1	3,723	13,857	1,014375	6,830
					0,0182
+74°6	567,75	3,644	13,276	1,025422	6,473

ezenkint $\frac{\alpha_{74°} - \alpha_{-2°}}{76°} = 0,0165$ | $\frac{\alpha_{-2} - \alpha_{+16}}{18} = 0,0167$ $\frac{\alpha_{16} - \alpha_{55}}{39} = 0,0155$

$\frac{\alpha_{16} - \alpha_{40}}{24} = 0,0146$ $\frac{\alpha_{55} - \alpha_{74}}{19} = 0,0182$ $a_{18} = 3,857$

$\frac{\alpha_{40} - \alpha_{74}}{34} = 0,0177$ $\frac{a^2_4 - a^2_{40}}{26} = 0,0270$ $\frac{\alpha_4 - \alpha_{40}}{26} = 0,0150$

$\frac{a^2_{40} - a^2_{24}}{24} = 0,0290$

2,65

0,0771

265

1855

2650

9,5915

77/1,215/1,71

77

544

509

80

15,956

15

0,0744

18

0,076

624

7700

$\lambda = 2,6250715$

0° 7,700

76

75°

15,6

45,75

4,46

4,5

$f = 7,617 - 1,36 - 0,35$

$5,49 \quad 71 \quad 7,617$

$6,127 \quad 1,71$

$5,907$

$0°$ nul $f_1 = f = 7,617 \quad \frac{df}{dt} = 0,0136$

$\lambda = 2,6207 \quad \frac{d\lambda}{dt} = -0,0000498$

$\frac{d(f-b)}{dt} = 0,0356$

$f\lambda = 19,956$

$0,0136$
007

$100°$ nul $f = 5,907 \quad \frac{df}{dt} = 0,0206$

$\lambda = 2,6574 \quad \frac{d\lambda}{dt} = +0,000673$

$0,050756$

$f\lambda = 15,695$

0,5872276

0,58727300
0,40908740
0,99636040

9,9166

0,59371690
0,33516297
0,92534660

8,4207

482
60
28920
241 | 28920 | 90

0,96

11,3965 1,4797
9,9166 1,4959
8,4207 1,5021
6,9186

200 | 17,04 | 0,0 3,21 120

200 | 69186 | 003

$$\frac{\lambda + T\frac{d\lambda}{dx}}{\lambda\lambda' + T'\frac{d\lambda\lambda'}{dx}} = \frac{\lambda}{\lambda\lambda'}$$

$$\lambda\lambda' T'\frac{d\lambda\lambda'}{dx} = \lambda\lambda' T\frac{d\lambda\lambda'}{dx}$$

$$\frac{d\lambda\lambda'}{d\lambda\lambda'} = \frac{\lambda\lambda' T}{T\lambda\lambda'}$$

8,245

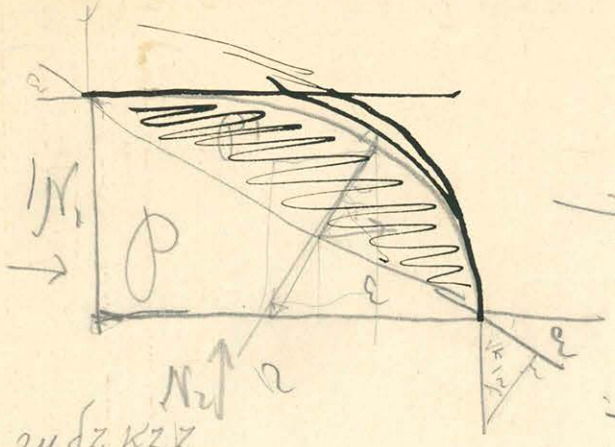
181

Lőrinczyné

[illegible] [illegible]

Kritikus hőmérsékletek

Folyadékok [illegible]



$$N_1 - f - \int dp \sin\delta = 0$$

$$\rightarrow P + P' - N_2 + f l + \int\int dp \sin\delta = 0$$

$$-f l \cos\varepsilon + f l \sin\varepsilon + P' \sin\varepsilon - \int\int dp \sin(\delta - \varepsilon) = 0$$

zu δz kürzen

$$-f l \cos\varepsilon + f l \sin\varepsilon + P' \sin\varepsilon \mp f \cos\varepsilon \int dp \sin\delta + f \sin\varepsilon \int dp \cos\delta = 0$$

$$dp = l\,ds \frac{\sin\delta}{\alpha}$$

$$P' + \int\int dp \cos\delta = N_2 - P - f l$$

$$\int\int dp \sin\delta = N_1 - f l$$

$$-f l \cos\varepsilon + f l \sin\varepsilon + \sin\varepsilon (N_2 - P - f l) - \cos\varepsilon (N_1 - f l) = 0$$

$$\sin\varepsilon (N_2 - P) - \cos\varepsilon N_1 = 0$$

$$N_1 = \int_h^{h+m} \kappa l z\, dz = \frac{\kappa l}{2} \left(h^2 + m^2 + 2mh - h^2\right)$$

$$N_1 = \frac{\kappa l}{2} \left(m^2 + 2mh\right)$$

$$N_2 = \gamma \kappa l (h + m)$$

$$P = \kappa l \gamma \frac{(h+m)}{2} \qquad P = \kappa l \gamma \frac{m}{2}$$

$$N_2 - P = \frac{\kappa l \gamma}{2} (h + m)$$

$$\gamma (h + m) \sin\varepsilon = (h^2 + 2mh) \cos\varepsilon$$

$$N_2 - P = \gamma \kappa l \left(h + \frac{m}{2}\right)$$

$$\gamma \left(h + \frac{m}{2}\right) \sin\varepsilon = \left(\frac{m^2}{2} + mh\right) \cos\varepsilon$$

$$\operatorname{tg}\varepsilon = \frac{m^2 + 2mh}{2\gamma h + \gamma m} \qquad h = m = \gamma \quad \text{ha} \quad h = 0$$

$$\operatorname{tg}\varepsilon = \frac{m(m + 2h)}{\gamma (2h + m}$$

$\frac{m}{A}$	$\frac{m}{a}$
0,5	0,9955
0,49	
0,48	
0,47	
0,46	
0,45	
0,44	
0,43	
0,42	
0,41	
0,40	

Basisfeld.

$\frac{X}{A} = \frac{M}{a} = 2,2$ $\quad \frac{m}{\mu} = \frac{\nu}{m} = 2,1547$ $\quad \frac{m}{\nu} = 0,4641$

$\frac{31}{710}$

mit Formula

$\frac{m}{a} = 2,2$

2,1547 / 1 = 0,4641

8 6 1 8 8

1 3 8 1 2 0

1 2 9 2 8 2

8 8 3 8 0

8 6 1 8 8

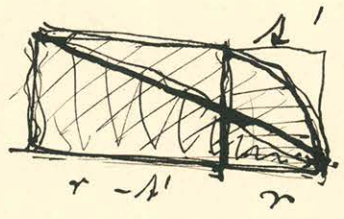
2 1 9 2 0

$$\int_0^{\frac{\pi}{2}} \frac{d\cos\varphi}{\sqrt{1-\cos^2\varphi}} = -\int_1^{} \frac{\sin\varphi\, d\varphi}{\sin\varphi} = \varphi$$

$$\frac{A^2-m^2}{A^4}\xi^2 = \cos^2\varphi.$$

$$I_2 = \frac{m}{A^2}\int_0^{A} \frac{d\xi}{\sqrt{1-\frac{A^2-m^2}{A^4}\xi^2}} = \frac{m}{A^2}\left\{\frac{A^2}{\sqrt{A^2-m^2}}\arcsin\xi\sqrt{\frac{A^2-m^2}{A^4}}\right\}$$

$$I_2 = \frac{m}{\sqrt{A^2-m^2}}\arcsin\frac{\sqrt{A^2-m^2}}{A}$$



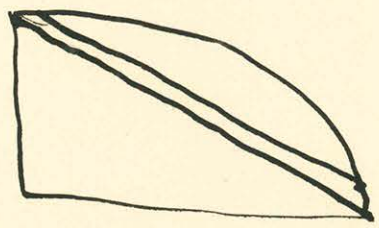
$P' =$ $\frac{1}{4}\pi A'm$

$$\frac{1}{4}\pi A'm + (r-A')m - \frac{mr}{2}$$

$$\frac{1}{4}\pi A'm + \frac{mr}{2} - A'm$$

$$\frac{mr}{2} + \left(\frac{\pi}{4}-1\right)A'm$$

$$\frac{mr}{2} - \left(1-\frac{\pi}{4}\right)A'm$$



$$\frac{mr}{2} - 0{,}2146\,A'm$$

$$-\frac{a^2}{2} + \frac{a^2}{2}\frac{m}{r} + \frac{m^2}{2} - 0{,}2146\frac{A'}{r}m^2 - \frac{a^2}{2}\cdot\frac{1}{2}\frac{m}{r}\frac{m}{\sqrt{r^2-m^2}}\log\frac{m^2}{2r^2-m^2-2r\sqrt{r^2-m^2}}$$

$$+\frac{a^2}{2}\frac{m}{r}\frac{m}{\sqrt{r^2-m^2}}\arcsin\frac{\sqrt{r^2-m^2}}{r} = 0$$

$$A' = m^2\frac{2mr+a^2}{a^2r}$$

$\frac{1}{8}\;\frac{1}{\sqrt{\frac{3}{4}}}$

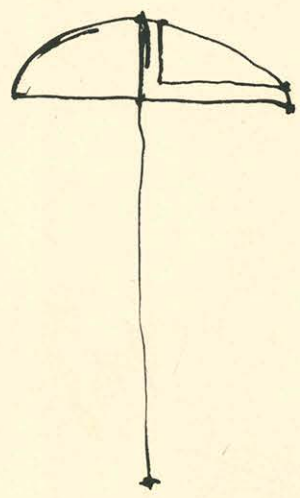
$\frac{1}{4\sqrt{3}}$

$\frac{1}{2}$

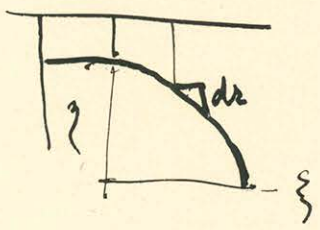
$\frac{1}{4}$

$\frac{1}{4} - \sqrt{\frac{3}{4}}$ 1,7

$\frac{1}{1-4\sqrt{3}}$



$\int \frac{dx}{u} \sin\vartheta$ $\int \frac{dx}{du} \cos\vartheta$



$u = \xi$

$\frac{dx}{du} = \operatorname{tg}\vartheta = -\frac{d\eta}{d\xi}$

$\sin\vartheta = \frac{\operatorname{tg}\vartheta}{\sqrt{1+\operatorname{tg}^2\vartheta}}$ $\cos\vartheta = \frac{1}{\sqrt{1+\operatorname{tg}^2\vartheta}}$

$J_1 = \int \frac{dx}{u} \sin\vartheta = + \int_0^A \frac{d\eta}{\xi} \cdot \frac{\frac{d\eta}{d\xi}}{\sqrt{1+\left(\frac{d\eta}{d\xi}\right)^2}}$

~~$dx = -d\eta$~~

$\sin\vartheta = -\frac{\frac{d\eta}{d\xi}}{\sqrt{1+\left(\frac{d\eta}{d\xi}\right)^2}}$

$J_2 = \int \frac{dx}{u} \cos\vartheta = -\int_0^A \frac{d\eta}{\xi} \frac{1}{\sqrt{1+\left(\frac{d\eta}{d\xi}\right)^2}}$

$\cos\vartheta = \frac{1}{\sqrt{1+\left(\frac{d\eta}{d\xi}\right)^2}}$

$\sqrt{1-x^2} = 1 + \frac{1}{2}x^2 - \frac{1 \cdot 1}{1 \cdot 2 \cdot 2^2}$

$+\frac{1}{2}\left(+\frac{1}{2}-1\right)$

$\sqrt{1-x^2} = 1 - \frac{1}{2}x^2 - \frac{1 \cdot 1}{2 \cdot 4}x^4 + \frac{1 \cdot 1 \cdot 3}{2 \cdot 4 \cdot 6}x^6 \cdot -$

$+ \frac{1}{8}x^4 +$

$$\sout{tg\,\varepsilon = \frac{m}{r} =}\ \mathcal{U}$$

$$\frac{m}{r} = \frac{+\mathcal{U} + f\int dp \sin\vartheta}{\mathcal{U} + P' + f\,\varepsilon \int dp \cos\vartheta}$$

$$P' + \int dp \cos\vartheta = N_2 - \mathcal{U} + P$$

$$N_2 = (m+h)\,r\,x + \ldots$$

$$(m+h)\,r + \frac{mr}{2} - \frac{a^2}{2}$$

$$\frac{m}{r}\left(\frac{mr}{2} + hr - \frac{a^2}{2}\right) = \frac{a^2}{2} + \frac{a^2}{2}\int dp \sin\vartheta$$

$$\frac{m^2}{2} + hm - \frac{a^2}{2}\frac{m}{r} = \frac{a^2}{2} + \frac{a^2}{2}\int$$

$$m^2 + 2hm = a^2\left(1 + \frac{m}{r}\right) + a^2\int$$

$$\frac{m}{r} = \frac{1}{2}$$

$$\frac{1}{8} \cdot \frac{2}{\sqrt{3}} \log \frac{1}{7 - 4\sqrt{3}}$$

1,73 × 2   12,5   2,5

4343 / 1 / 0,2   6,9   0,08   1,097   1,73 / 0,620 / 0,36

8686   2,3   519

4314   329   1010

219

2,323

2,1

$$\frac{1}{2}\,\frac{1+u^2}{u^2}\log\frac{1+u}{1-u}+\frac{u-1}{u(1-u)}=0.$$

$$\frac{1}{2}\,\frac{1+u^2}{u}\log\frac{1+u}{1-u}-1=0.$$

$$u=\sqrt{1-x}\qquad x=\frac{m}{r}.$$

$$\log\frac{1+u}{1-u}=\frac{2u}{1+u^2}$$

$u=0$ jo.

$u,01$

9 / 1,1 / 1,2222

0,20049

u	$\log\frac{1+u}{1-u}$	$\frac{2u}{1+u^2}$
0	0	0
0,1	0,20049	0,198
0,2	0,40547	0,3846

1,01 / 0,200 / 1,198

100
3300
909
810

8 / 1,2 / 1,5 1,01 / 0,2 / 1

1,04 / 460 /

104 / 0,400 / 0,3846
312
880
812
4880
416
640

$$\sqrt{1-x}=u$$

$$\frac{u^2-1}{(u-1)^2}=\frac{u+1}{}$$

$$\frac{u^2-1}{u}\cdot\log\frac{u+1}{u-1}$$

$$\frac{m^2}{r^2} + 2\frac{m}{r}\frac{h}{r} - \frac{A}{r}\alpha\frac{m^2}{r^2} - \beta\frac{A}{r}\frac{h}{r}\frac{m}{r} - \frac{a^2}{r^2}\frac{\mathcal{E}}{r} = \frac{a^2}{r^2}$$

$\alpha = 0{,}0959$

$\beta = 0{,}4292$

$$\frac{A}{r} = \frac{m^2}{r^2}\left(\frac{2mr}{a^2} + \frac{2hr}{a^2} - 1\right) = \frac{m^2}{r^2}\left(2\frac{\frac{m}{r}}{\frac{a}{r}\frac{a}{r}} + 2\frac{\frac{h}{r}}{\frac{a}{r}\cdot\frac{a}{r}} - 1\right)$$

$$\frac{h}{r} = \frac{a^2}{r^2} + \alpha\frac{m}{r}\frac{A^2}{r^2} - \beta\frac{m}{r}\frac{A}{r} \qquad \mathcal{E}$$

$$\frac{\mathcal{E}}{r} = \frac{A}{4}\left(\frac{A}{r} + \frac{m}{r}\right)\left\{1 + \frac{1}{4}\left(\frac{\frac{A}{r} - \frac{m}{r}}{\frac{A}{r} + \frac{m}{r}}\right)^2 + \frac{1}{64}\left\{\frac{\frac{A}{r} - \frac{m}{r}}{\frac{A}{r} + \frac{m}{r}}\right\}^4\right\} - \frac{A}{r}$$

$\frac{a}{r}$ $\frac{h}{r}$ $\frac{a}{r}$ $\frac{A}{r}$ $\frac{\mathcal{E}}{r}$

$$\begin{cases} m^2 + 2mh - \alpha A m^2 - \beta A h m - a^2\mathcal{E} = a^2 \\ A = m^2\left(2\frac{m}{a^2} + 2\frac{h}{a^2} - 1\right) = 2\frac{m^3}{a^2} + \frac{2m^2h}{a^2} - m^2 \end{cases}$$

$$\frac{A}{r} = \frac{2\frac{m^3}{r^3}}{\frac{a^2}{r^2}}$$

$$-\frac{A}{r} = \frac{2m^3}{a^2} \qquad A = \frac{2m^3}{a^2}$$

$$h = a^2 + \alpha m A^2 - \beta m A$$

$$h = \left(A + m^2 - \frac{2m^3}{a^2}\right)\frac{a^2}{2m^2} = \frac{Aa^2}{2m^2} + \frac{a^2}{2} - m$$

$$m\frac{2mr + a^2}{a^2 r}$$

$$\frac{\partial A}{\partial h} = \frac{m^2}{a^2}$$

$$A = 0 \qquad \frac{A}{r} = \frac{2\frac{m^3}{r^3}}{a^2}$$

$$\frac{Aa^2}{2m^2} + \frac{a^2}{2} - m = a^2 + \alpha m A^2 - \beta m A$$

$$A\left(\frac{a^2}{2m^2} + \beta m - \alpha m A\right) = \frac{a^2}{2} + m$$

$$A\left(\frac{a^2}{2m^2} + \beta m - \frac{\alpha m\left(\frac{a^2}{2} + m\right)}{\frac{a^2}{2m^2} + \beta m}\right) = \frac{a^2}{2} + m$$

$$A = \frac{\frac{a^2}{2} + m}{\frac{a^2}{2m^2} + \beta m}$$

$\frac{h}{r}$ $\frac{hr}{a}$

$\frac{a^2}{r^2}$

$$h = a^2 + \alpha\frac{4m^2}{a^2} - \beta$$

$z = y + h \qquad z - h = y$

$\frac{dy}{dx^2}$

$$\frac{\frac{d^2y}{du^2}}{\left(1+\left(\frac{dy}{du}\right)^2\right)^{\frac{3}{2}}} + \frac{\frac{1}{u}\frac{dy}{du}}{\left(1+\left(\frac{dy}{du}\right)^2\right)^{\frac{1}{2}}} = \frac{2y}{a^2} + \frac{2h}{a^2}$$

$$y = u\, e^{\left(\frac{y}{u}-1\right)c}$$

$$\frac{dy}{du} = e^{\left(\frac{y}{u}-1\right)c} + u\, e^{\left(\frac{y}{u}-1\right)c}\left(\frac{c}{u}\frac{dy}{du} - \frac{cy}{u^2}\right)$$

$$\frac{dy}{du} = \frac{y}{u} + \frac{y}{u}\left(c\frac{dy}{du} - c\frac{y}{u}\right)$$

I

$$\frac{dy}{du} - \frac{y}{u} = c\frac{y}{u}\left(\frac{dy}{du} - \frac{y}{u}\right) \qquad c\frac{y}{u} = 1$$

$$c = \frac{u}{y} \qquad u^h$$

$$y = u\, e^{\left(\frac{u}{y}-1\right)c}$$

$$\frac{y}{u} = \qquad \ln u = y \qquad \text{ha } u = \infty$$

$$\frac{y}{h} = C'\, e^{\frac{u}{y}}$$

$$m + h = h\,\frac{1}{\sqrt{1+r\sqrt{2}}}\sqrt{\frac{a}{r}}\, e^{\frac{r\sqrt{2}}{a}} \qquad \mu = \frac{a^2}{h}$$

$$h = \frac{m}{\frac{1}{\sqrt{1+r\sqrt{2}}}\sqrt{\frac{a}{r}}\, e^{\frac{r\sqrt{2}}{a}} - 1}$$

$$\mu = \frac{a^2}{m}\,\frac{1}{\sqrt{1+r\sqrt{2}}}\sqrt{\frac{a}{r}}\, e^{\frac{r\sqrt{2}}{a}} - \frac{a^2}{m}$$

3,14
6,28
1,4
25,1
6,28
8,72
0,296

0,296

$\frac{\sqrt{2}+1}{2\sqrt{2}}$ $\frac{2414}{2828}$

$$A^4 + m^2\xi^2 = A^2\xi^2 - A^2\xi^2 - \frac{m^2 - A^2}{A^2}\xi^4$$

$$(A^2 - \xi^2)^2 - \xi^4 - \frac{m^2}{A^2}\xi^4 + m^2\xi^2$$

$$(A^2 - \xi^2)^2 + \frac{m^2}{A^2}\xi^2(A^2 - \xi^2) = \checkmark$$

$$A^4 + (m^2 - 2A^2)\xi^2 + \frac{A^2 - m^2}{A^2}\xi^4 \qquad \xi^2 = u$$

$$\frac{1}{2}\int_0^{A^2} \frac{du}{\sqrt{A^4 - (2A^2 - m^2)u + \frac{A^2 m^2}{A^2}u^2}} = \quad A^4 - 2A^4 + \cancel{A^2} + A^4 - \cancel{m^2 A^2}$$

$$= \frac{1}{2}\frac{A}{\sqrt{A^2 - m^2}} \log\left\{2\frac{A^2 - m^2}{A^2}u + (2A^2 - m^2) + 2\frac{\sqrt{A^2 - m^2}}{A}\sqrt{X}\right\}_0^{A^2}$$

$$= + \frac{1}{2}\frac{A}{\sqrt{A^2 - m^2}}\left\{\log\left\{\cancel{2\frac{A^2 - m^2}{m}}\right\} - m^2\right.$$

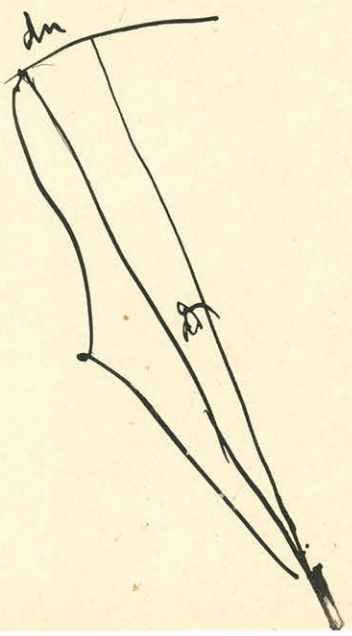
$$\left. - \log\left(-(2A^2 - m^2) + 2A\sqrt{A^2 - m^2}\right.\right.$$

$$J_1 = \frac{m^2}{A^2}\frac{1}{2}\frac{A}{\sqrt{A^2 - m^2}} \log \frac{m^2}{2A^2 - m^2 - 2A\sqrt{A^2 - m^2}}$$

$$2\sqrt{A^4 - m^2A^2}$$

$$\frac{1}{-1 + \frac{1}{\sqrt{1-x}}} \qquad \log \frac{m^2}{A^2\left\{2 - \frac{m^2}{A^2} - 2\sqrt{1 - \frac{m^2}{A^2}}\right.}$$

3·1415·9
0·785·4
0·2146



$$\frac{ds\sin\vartheta\sin\vartheta}{u} \qquad \frac{dr\sin^2\vartheta}{u} \qquad \frac{ds\sin\vartheta\cdot\sin\vartheta}{u}$$

$$\frac{\sin\vartheta}{u}+\frac{d\vartheta}{ds}=\frac{2z}{a^2}$$

$$\frac{ds\sin^2\vartheta}{u}+\frac{\sin^2\vartheta\,d\vartheta}{u}=\frac{2z\,ds\sin^2\vartheta}{u}$$

$$\frac{2z\,dz\sin\vartheta}{u}$$

$$\frac{ds\sin^2\vartheta}{u}+\sin\vartheta\,d\vartheta=\frac{2z\sin\vartheta\,d\vartheta}{a^2}$$

$$ds\sin\vartheta\frac{\sin\vartheta}{u}+\sin\vartheta\,d\vartheta=\frac{2z\sin\vartheta\,ds}{a^2}$$

$$\int ds\sin\vartheta\frac{\sin\vartheta}{u}=\left|\frac{z^2}{a^2}+\cos\vartheta\right|$$

$$\frac{m}{r}=\frac{\frac{a^2}{2}+\frac{1}{2}(m^2+2mh)-\frac{a^2}{2}}{\frac{m}{2}\left(\frac{mr}{2}+hr-\frac{a^2}{2}\right)}$$

$$\frac{m^2}{r^2}+mh-\frac{a^2m}{2r}=\frac{a^2}{2}+\frac{m^2}{2}+mh$$

$$\frac{m^2}{2}+hm-\frac{a^2}{2}\frac{m}{r}=\frac{m^2}{2}+hm$$

$$\frac{m^2}{2}+mh-\frac{a^2}{2}=\frac{m^2}{2}-mh+\frac{a^2}{2}$$

$$J_1 = \int_0^A \frac{1}{\xi}\left(\frac{dy}{d\xi}\right)^2 \frac{1}{\sqrt{1+\left(\frac{dy}{d\xi}\right)^2}}\, d\xi.$$

$$J_2 = -\int_0^A \frac{1}{\xi}\frac{dy}{d\xi}\,\frac{1}{\sqrt{1+\left(\frac{dy}{d\xi}\right)^2}}\, d\xi.$$

$$\frac{\xi^2}{A^2} + \frac{\eta^2}{m^2} = 1$$

$$\eta^2 = \frac{m^2}{A^2}(A^2 - \xi^2)$$

$$\frac{2\xi}{A^2} + \frac{2\eta}{m^2}\frac{dy}{d\xi} = 0$$

$$\frac{dy}{d\xi} = -\frac{\xi m^2}{A^2 \eta}$$

$$= -\frac{m^2}{A^2}\frac{\xi}{\eta}$$

$$J_1 = \int_0^A \frac{1}{\xi}\frac{m^4}{A^4}\frac{\xi^2}{\frac{m^2}{A^2}(A^2-\xi^2)}\,\frac{1}{\sqrt{1+\frac{m^4}{A^4}\frac{\xi^2}{\frac{m^2}{A^2}(A^2-\xi^2)}}}\, d\xi$$

$$= \frac{m^2}{A^2}\int_0^A \frac{\xi}{\sqrt{A^2-\xi^2}}\cdot\frac{1}{\sqrt{A^2-\xi^2+\frac{m^2}{A^2}\xi^2}}\, d\xi$$

$$= \frac{m^2}{A^2}\int_0^A \frac{\xi\, d\xi}{\sqrt{(A^2-\xi^2)\left(A^2+\frac{m^2-A^2}{A^2}\xi^2\right)}}$$

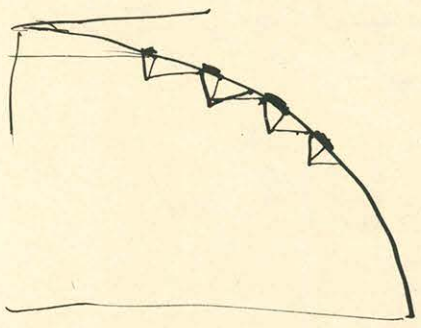
$$J_1 = \frac{m^2}{A^2}$$

$$J_2 = +\int_0^A \frac{1}{\xi}\frac{m^2\xi}{A^2\frac{m}{A}\sqrt{A^2-\xi^2}}\cdot\frac{1}{\sqrt{1+\frac{m^2}{A^2}\frac{\xi^2}{A^2-\xi^2}}}\, d\xi.$$

$$= \frac{m}{A}\int_0^A \frac{d\xi}{\sqrt{A^2+\frac{m^2-A^2}{A^2}\xi^2}}$$

$\frac{\sin \delta}{x}$ $\frac{\cos \delta}{x}$.

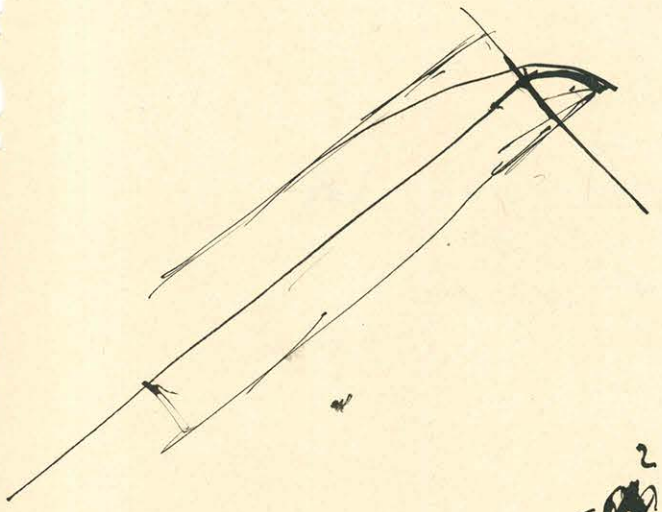
$\frac{1}{x} \frac{dz}{dx} \cdot \frac{\frac{dz}{dx}}{\sqrt{1+\left(\frac{dz}{dx}\right)^2}} \cdot dx$ $\int \frac{1}{x} \frac{\left(\frac{dz}{dx}\right)^2}{\sqrt{1+\left(\frac{dz}{dx}\right)^2}} dx$

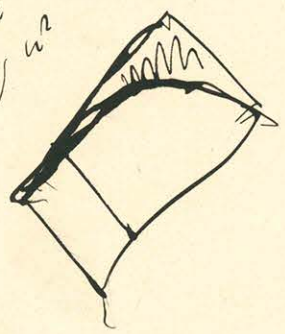


$\int \frac{1}{x} \frac{\frac{dz}{dx}}{\sqrt{1+\left(\frac{dz}{dx}\right)^2}} dx$

$\frac{dz}{dx} dx.$ $\frac{x^2}{a^2} + \frac{z^2}{b^2} = 1$

$\frac{dz}{dx} = -\frac{b^2 x}{a^2 z}$





$$J = \frac{m^2}{x^2} \cdot \frac{1}{2} \frac{1}{\sqrt{1-\frac{m^2}{x^2}}} \ln \frac{\frac{m^2}{x^2}}{2 - \frac{m^2}{x^2} - 2\sqrt{1-\frac{m^2}{x^2}}}$$

$$\frac{m^2}{x^2} = x$$

$$J = \frac{1}{2} \frac{x}{\sqrt{1-x}} \ln \frac{x}{2 - x - 2\sqrt{1-x}}$$

$$\frac{dJ}{dx} = \frac{1}{2} \ln \frac{x}{2-x-2\sqrt{1-x}} \left\{ \frac{1}{\sqrt{1-x}} + \frac{1}{2} \frac{x}{(1-x)^{\frac{3}{2}}} \right\}$$

$$+ \frac{1}{2} \frac{x}{\sqrt{1-x}} \cdot \frac{2-x-2\sqrt{1-x}}{x} \left(\frac{1}{2-x-2\sqrt{1-x}} - \frac{x\left(-1+\frac{1}{\sqrt{1-x}}\right)}{(2-x-2\sqrt{1-x})^2} \right)$$

$$= 0$$

$$\frac{1}{2} \ln \frac{x}{2-x-2\sqrt{1-x}} \left\{ \frac{2-x}{1-x} \right\} + 1 - \frac{x\left(-1+\frac{1}{\sqrt{1-x}}\right)}{x-1\sqrt{2-x-2}} = 0.$$

$$\sqrt{1-x} = u$$

$$x = 1 - u^2$$

$$\frac{1}{2} \ln \frac{1-u^2}{2-1+u^2-2u} \cdot \frac{1+u^2}{u^2} + 1 + \frac{(1-u^2)\left(-1+\frac{1}{u}\right)}{1+u^2-2u} = 0$$

$$\frac{1}{2} \ln \frac{1+u}{1-u} \cdot \frac{1+u^2}{u^2} + \frac{\left(-1+\frac{1}{u}\right)(1-u^2) - (u-1)}{(1-u)^2} = 0.$$

$$\frac{1}{2} \frac{1+u^2}{u^2} \ln \frac{1+u}{1-u} + \frac{\frac{u}{u+1} - (u+1) + u - 1}{1+u} = 0.$$

$$\chi = -\frac{i}{2} \ln x \pm \frac{1}{2} \sqrt{1-4x^2} \pm \frac{1}{4} \ln \frac{\sqrt{1-4x^2}-1}{\sqrt{1-4x^2}+1} + C$$

$$d\chi = -\frac{i}{2} \frac{dx}{x} \pm \frac{1}{2} \frac{1}{x} \sqrt{1-4x^2}\, dx.$$

$$\chi = -\frac{i}{2} \ln x \pm \frac{1}{2} \int \frac{1}{x} \sqrt{1-4x^2}\, dx + C$$

$$\frac{d\chi}{dx} = -\frac{1}{2x} \pm \sqrt{\frac{1}{4x^2}-1} = -\frac{1}{2x} \pm \frac{1}{2x} \sqrt{1-4x^2}$$

$$\frac{m}{2 - \frac{m}{m+1}}$$

$$\frac{m}{2m-1-m^2}$$

$$\ln\frac{1+u}{1-u} = 2\left\{u + \frac{1}{3}u^3 + \frac{1}{5}u^5 + -\right.$$

$$2\left\{u - u^3 + u^5\right.$$

$$\frac{4}{3}u^3 - \frac{4}{5}u^5 \qquad u^2 = \frac{5}{3} = 1.666.$$

$$=$$

0.0096

~~0.00384~~

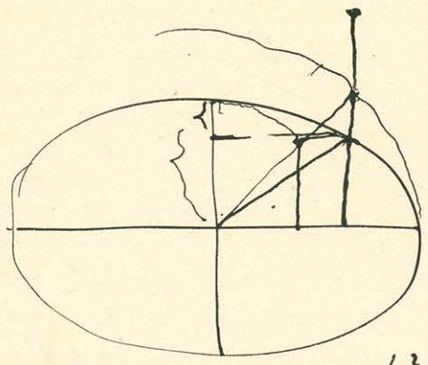
$x = A\cos t$

$y = B\sin t$

$\frac{dx}{dy} = \operatorname{tg} t$

$\frac{dy}{dx} = -\frac{B\cos t}{A\sin t} = -\frac{B}{A}\operatorname{cotg} t = -\operatorname{tg}\delta$

$\operatorname{tg}\delta = \frac{B}{A}\operatorname{cotg} t$



$h + m + y = B + h$

$\sin t = \operatorname{tg} t = \frac{B}{A}\operatorname{cotg}\delta$

$\sin t = \frac{B}{A}\operatorname{cotg}\delta$

$\cos t = \frac{1}{\sqrt{1+\operatorname{tg}^2 t}}$

$\sin t = \frac{\frac{B}{A}\operatorname{cotg}\delta}{\sqrt{1+\frac{B^2}{A^2}\operatorname{cotg}^2\delta}}$

$\cos t = \frac{1}{\sqrt{1+\frac{B^2}{A^2}\operatorname{cotg}^2\delta}}$

$\rho = \frac{\left(B^2 - \frac{B^2-A^2}{B^2}y^2\right)^{\frac{3}{2}}}{AB}$

$y = B - m$

$\rho = \frac{\left(A^2 - \frac{A^2-B^2}{A^2}x^2\right)^{\frac{3}{2}}}{AB}$

$\frac{1}{\rho} = \frac{2(h+m)}{a^2} - \frac{\sin\delta}{u} = \frac{AB}{\left(A^2 - \frac{A^2-B^2}{A^2}(B-m)^2\right)^{\frac{3}{2}}}$

$B - m = y = B\frac{\frac{B}{A}\operatorname{cotg}\delta}{\sqrt{1+\frac{B^2}{A^2}\operatorname{cotg}^2\delta}}$

$\omega = A\frac{1}{\sqrt{1+\frac{B^2}{A^2}\operatorname{cotg}^2\delta}} = \frac{A^2}{B^2}\frac{B-m}{\operatorname{cotg}\delta}\operatorname{tg}\delta$

$\frac{B-m}{B}\frac{2}{A}\operatorname{cotg}\delta$

$\frac{B^2}{A^2} = \frac{A}{B}$

$u =$

4,12
18
4,128
18,7
28966
33104
4128
77,3806
154,76
14,65
140,11

m² 16,97
2mh 0,148
17,118
2,117
15001

0,755
0,615
1,347
2117

16,97
140,1
1697
67880
1697
274 | 2377,497 / 8,676
2192 8,677.
1854
1644
2100
1918
1820
1

14,65
1,72
2930
10255
1465
18,7 | 25,198,0 / 1,347.
187
649
561
880
748
561
888
748
1400

14,65
18,7
10255
11720
1465
273,955

0,018

~~4000324~~

$+ \frac{1}{400}$

16,97
0,0959
15273
8485
15273
1,627427

1,627
0,464
6508
9762
6508
0,754928

0,148

~~18,676~~
18,7 | 18,677 | 0,46401
748
1197
1122
750
748
200

4,12
0,018
0,3296
412
0,07416
0,429
0,074
1716
3003
0,031716
0,464
1268
1902
1268
0,0147088

2,444 $\frac{A}{r}$ 1,020

4,306
0,0959
28754
21530
28754
0,4129,454
102
8258
41290
0,421158

4,306
22451
26,757
12,088
1467

0,421

2,075
5,41
2075
8300
10385
11,23,575

4292
11,23
12876
8584
4292
4292
48199,16

4,820
4,916

26,757
11992
14,765

4,820
1,02
964
4820
4,9164

4,820
421
6751
11,992

4,916
421
6751
12088

26757
12088
14,67

Ha mint most δ kicsiny akkor.

~~$B = m - B$~~ ~~lehát $B = \frac{m}{2}$~~ és

~~$\frac{2(h+m)}{a^2} = \frac{\delta}{u} = \frac{A}{\quad}$~~

ha most δ kicsiny akkor

$$(B-m)^2 = B^2 \frac{\frac{B^2}{A^2}\frac{1}{\delta^2}}{1+\frac{B^2}{A^2}\delta^2} = B^2 \frac{1}{1+\frac{A^2}{B^2}\delta^2} = B^2$$

$$(B^2+m^2-2Bm)\left(1+\frac{A^2}{B^2}\delta^2\right) = B^2$$

$$\cancel{B^2} + m^2 - 2Bm + A^2\delta + \frac{A^2}{B^2}\delta^2 m^2 - 2\frac{A^2}{B} m \delta^2 = \cancel{B^2}$$

$$m^2 \underline{B^2} - 2\underline{B}^3 m + A^2 \underline{B^2} \delta + \underbrace{A^2 m^2 \delta^2 - 2A^2 \underline{B} m \delta^2}_{} = 0$$

~~mB~~ $m^2 - 2Bm + A^2\delta = 0$ tehát $\underline{\underline{B = \frac{m^2 + A^2\delta}{2m}}}$

Ablaky illés

felvámi fordulatsága

A csövek forró alkoholjában

A Hennometer +48-ik osztásnyi forró gőzben: +77,9
A " +20 " " " " 77,8

3. számú cső

Meniscus

67,26 67,26 67,28
65,16 65,16 65,16
2,10 2,10 2,12

90 –
38 vízm. 368
30 víz
39 371
49
0

Fajsúly kísérlet = Csucs + (48) + 2,11 × 47,036 (1 + 14/1000) + meniscus

= 6348,7 + 99,4 + 27,0

V = 6474,6 (104) W = 2927,4

V = 6490,8

1. számú cső

Meniscus.

V = csucs + – 12,43 × 47×450 (1 + 14/10000) + 27,0

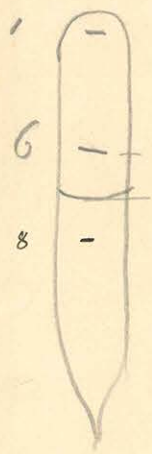
V = 1740,1

W = 7512,3

69,54 69,54 69,54
61,96 61,98 61,98
7,58 7,56 7,56

2. számú cső

Meniscus.



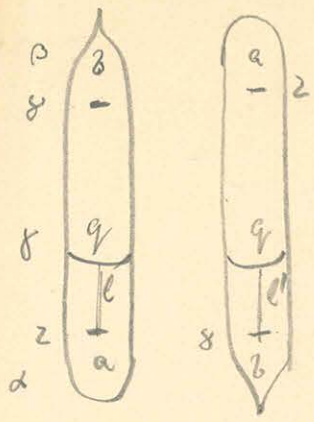
V = csucs + (68) – 3,64 × 45,787 (1 + 14/1000) + 27,0

V = 4021,9

W = 4974,2

20,90 20,90 20,90
17,26 17,26 17,26
3,64 3,64 3,64

Hennometer +20.ú forró gőzben 77,8



$$a_1\alpha - b_1\beta + (l_1 - l_1')q_1\gamma = b_1 - (l_1 - l_1')q_1 - a_1 = A$$
$$a_2\alpha - b_2\beta + (l_2 - l_2')q_2\gamma = b_2 - (l_2 - l_2')q_2 - a_2 = B$$
$$a_3\alpha - b_3\beta + (l_3 - l_3')q_3\gamma = b_3 - (l_3 - l_3')q_3 - a_3 = C$$

$$\alpha = \frac{\begin{vmatrix} A & -b_1 (l_1-l_1')q_1 \\ B & -b_2 (l_2-l_2')q_2 \\ C & -b_3 (l_3-l_3')q_3 \end{vmatrix}}{\begin{vmatrix} a_1 & -b_1 (l_1-l_1')q_1 \\ a_2 & -b_2 (l_2-l_2')q_2 \\ a_3 & -b_3 (l_3-l_3')q_3 \end{vmatrix}}$$

$$\alpha = \frac{A\left[-b_2(l_3-l_3')q_3 + b_3(l_2-l_1')q_2\right] - B\left[-b_1(l_3-l_3') + b_3(l_1-l_1')q_1\right] + C\left[-b_1(l_2-l_2')q_2 + b_2(l_1-l_2')q_2\right]}{a_1\left[-b_2(l_3-l_3')q_3 + b_3(l_2-l_2')q_2\right] - a_2\left[-b_1(l_3-l_3') + b_3(l_1-l_1')q_1\right] + a_3\left[-b_1(l_2-l_2')q_2 + b_2(l_1-l_1')q_1\right]}$$

$\beta =$ ———————————————

$\gamma =$ ———————————————

$a_1 = 1229{,}8$ $\quad b_1 = 2304{,}5$ $\quad q_1 = 47{,}474$ $\quad l_1 - l_1' = 22{,}75$

$a_2 = 1158{,}8$ $\quad b_2 = 2320{,}6$ $\quad q_2 = 45{,}800$ $\quad l_2 - l_2' = 25{,}79$

$a_3 = 1161{,}6$ $\quad b_3 = 2577{,}9$ $\quad q_3 = 47{,}129$ $\quad l_3 - l_3' = 30{,}32$

$q_1(l_1 - l_1') = 1080{,}1$ $\quad A = -5{,}4$

$1181{,}2 = q_2(l_2 - l_2') =$ [illegible] $\quad B =$ [illegible] $-19{,}4$

$q_3(l_3 - l_3') = 1429{,}0$ $\quad C = -12{,}2$

---

1) $1229{,}8\,\alpha - 2304{,}5\beta + 1080{,}1\gamma = -5{,}4$

2) $1158{,}8\,\alpha - 2320{,}6\beta + 1181{,}2\gamma = -19{,}4$

3) $1161{,}6\,\alpha - 2577{,}9\beta + 1429{,}0\gamma = -12{,}2$

---

1. mérési üveges súly = 36,516 gr.

Mérleg alsóa üveggel és tárával.

5,8 — 6,3 — 6,9 — 19,10

12,0 — 11,5 — 23,5

üveg: $\frac{6,33 + 11,75}{2} = \frac{18,08}{2} = 9,04$ = Egyensúly

tára

Súllyal:

9,1 — 9,2 — 9,3 — 9,20

9,8 — 9,7 — 9,75

$\frac{18,95}{2} = 9,48$ = Egyensúly

$\frac{0,44}{1,11} = \frac{44}{111} = 0,4$

Az mérlegen levőnek: ~~44~~ 36,52 gram.

10,0 — 10,2 — 10,9 — 10,3 — 10,12

11,1 — 10,9 — 11,00

Az mérlegen 36,53 gr.

$\frac{21,17}{2} = 10,59$ = Egyensúly

0,01 gram = 1,11 osztásrész

2. mérési eső = 37,046 gr.

Üveges és tárával

10,9 — 11,1 — 11,4 — 11,13

13,1 — 12,9 — 13,00

$\frac{24,13}{2} = 12,07$ = Egyensúly

$\frac{0,48}{1,11} = 0,4$

Súllyal

10,9 — 11,2 — 11,5 — 11,20

14,0 — 13,8 — 13,90

A mérlegen - 37,05 gr.

$\frac{25,10}{2} = 12,55$ = Egyensúly

3. mérési eső = 35,795

Üveges a tára

5,9 — 6,2 — 6,6 — 6,9 — 6,40

9,8 — 9,2 — 8,9 — 9,30

$\frac{15,20}{2} = 7,85$ = Egyensúly

Súllyal

7,1 — 7,4 — 7,25

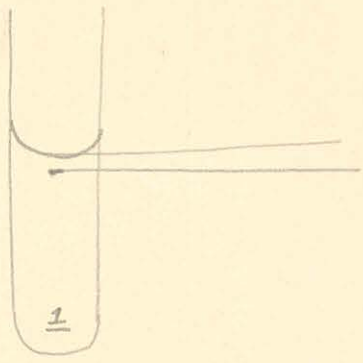
9,9 — 9,5 — 9,2 — 9,53

Mérlegen: 35,80 gr.

$\frac{16,38}{2} = 8,39$ = Egyensúly

$\frac{0,54}{1,11} = 0,5$

1 kanni cső : = 36,516 g.



62,82 62,80 62,82 $t = 16°,0$
61,84 61,84 61,84
0,98 0,96 0,98

Üveges s. tara

9,9 11,1
10,1 10,9
11,00
10,2
10,07

$\frac{21,04}{2} = 10,54$ = Eyaml

Puffal

9,7 10,8
9,8 10,5
10,65
10,0
9,83

$\frac{20,48}{2} = 10,24$

Mercyen levő anyag 37,83
37,833
36,516
1,318

$\frac{0,30}{1,11} = 0,3$

50,92 50,96 50,96 50,98 50,98
50,04 50,04 50,06 50,06 50,04
0,88 0,92 0,90 0,92 0,94

Üveges s. tara

9,0 12,0
9,4 11,7
9,9 11,2
10,1 11,63
9,60

$\frac{21,23}{2} = 10,62$

Puffal

10,3 11,1
10,5 11,0
10,6 11,05
10,47

$\frac{21,52}{2} = 10,7^1$

$\frac{0,09}{1,11} = 0,1$

$t = 16,3$

Mercyen levő anyag 39,74
39,739
36,516
3,223

52,28 52,30 50,26
52,18 50,18 50,16
0,10 0,12 0,10

Tara a mérőcső — Lufival

9,2 — 10,0 — 8,7 — 9,7
9,4 — 9,9 — 8,9 — 9,4
9,5 — 9,95 — 9,1 — 9,55
9,37 — 9,66 = Egyenes — 8,90 — $\frac{18,45}{2}$ = 9,23 = Egyenes

Merlegen 41,62 gr.

41,624
36,516
5,108

$\frac{0,23}{4,11}$ = 0,4

50,51 50,52 50,52
50,32 50,31 50,30
0,19 0,21 0,22

Tara a mérőcső — Lufival

7,13 — 9,7 — 6,9 — 9,9
7,17 — 9,4 — 7,2 — 9,6
8,0 — 9,55 — 7,6 — 9,35
8,63 — $\frac{17,22}{2}$ = 8,61 = Egyenes — 8,23 — $\frac{16,98}{2}$ = 8,49

Merlegen 43,52 gr.

43,521
36,516
7,005

$\frac{0,12}{1,11}$ = 0,1

51,38 51,38 51,38
50,96 50,98 50,98
0,42 0,40 0,20

$\bar{z} = 16,8$

Üveges tára

10,2
10,5
10,7
10,7
10,52

11,2
11,1
11,0
11,10
21,62 / 2 = 10,81

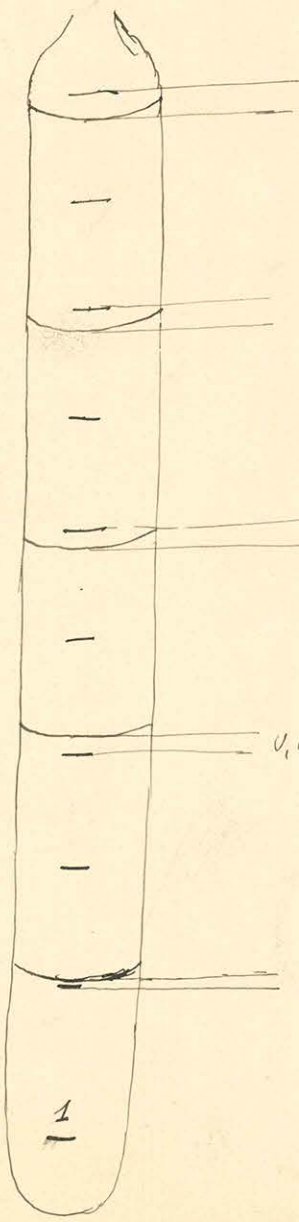
Lapd

10,4
10,4
10,5
10,43

11,1
11,0
11,05
21,48 / 2 = 10,74
0,08 / 1,11 = 0,1

Mérleg 45,45 gr.

45,451
36,516
2,945

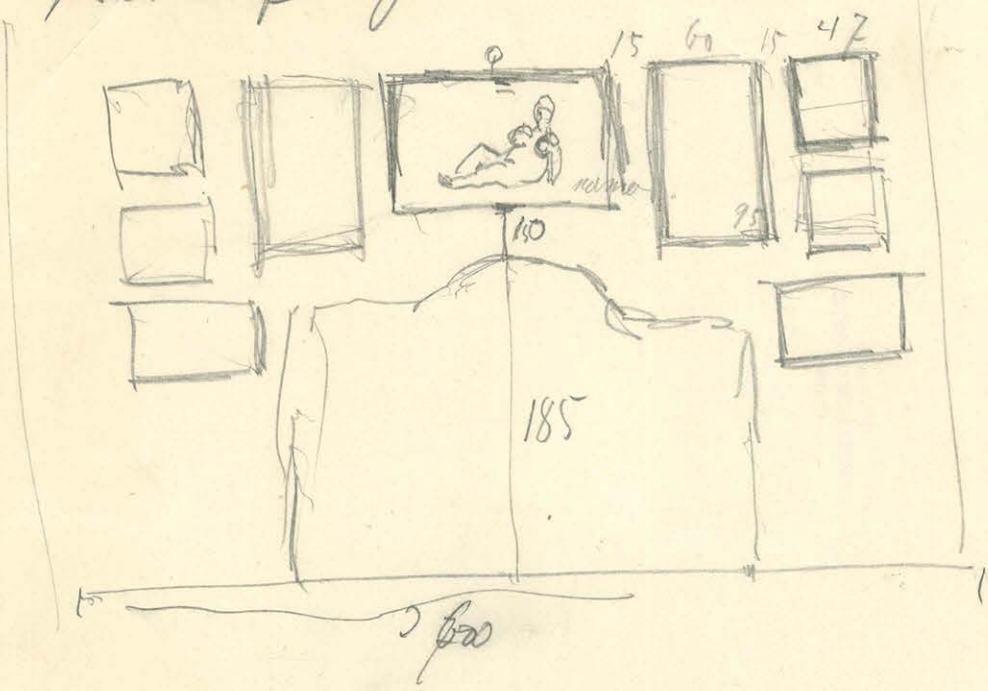


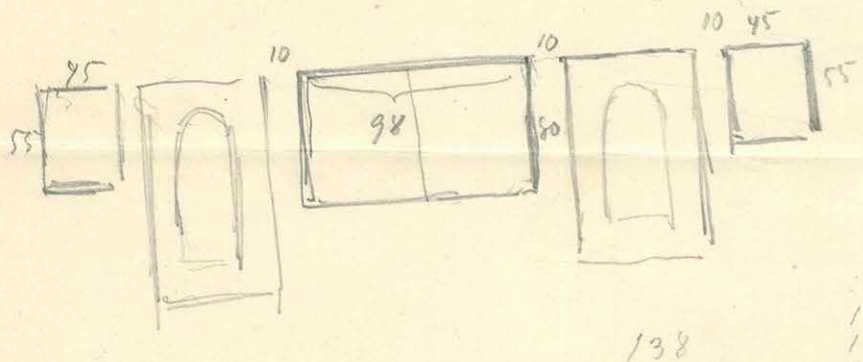
0,20 2,945 gr.
0,21 m.m. 4,005 gr.
0,10 m.m. 5,108 gr.
0,92 m.m. 3,223 gr.
0,98 m.m. 1,317 gr.

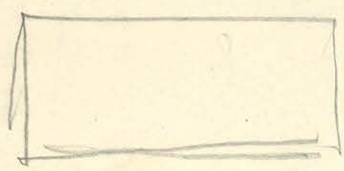
1,940 gr.
1,898 gr.
1,885 gr.
1,906 gr.

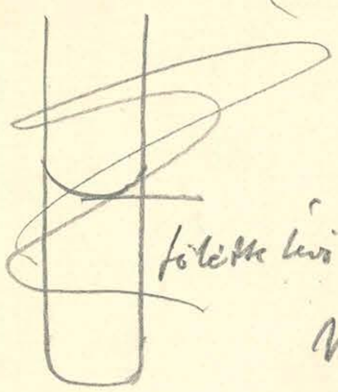
Ebédlő

Konyhai fabútor









~~temperatura: -79~~ =

temp- 70

Meniscus 84,82

fölötte levő Márka 91,08

Meniscusmagasság 5 [illegible] 4 [illegible] hátra
503 2

498 10 8 5 [illegible] előre

~~temp 60~~
56,

Temp – 63

Meniscus : 99, 28 } 6,78
alatta levő márka : 92, 50

Meniscusmagasság: 81
51 előre 470
38 469
69

Meniscus: 101,22 Temp – 43 –

alatta Márka 92,34

meniskusmagasság 8
8 4 Körülforgás hátra.
2,41 482 90
88
2,42 483 5 ~~4 Kör~~ előre

temp - 26,5

Meniscus 103, 52

Márka alatt 92, 42

Meniscus ugyan ~~58~~ 50

88 előre 462

98

61 hátra 463

47

87 előre 460

Az alkoholos thermometer olvasó higanyban:

I számú cső — Március 3

t = 14,4 - 0,4

10 — 218,10 — 218,08 — 218,10

0,02

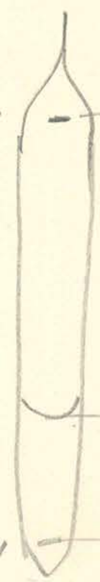
12
11
22

65,98 — 66,00 — 66,00

t = 14,7 - 0,4

1 — 38,08 — 38,08 — 38,08

II számú cső



9 — 186,28 — 186,28 — 186,28

94
91

99,92 — 99,92 — 99,92

159,94 — 159,94 — 159,94

20
92
12

1 — 26,34 — 26,34 — 26,34

III számú cső

t = 14,8 - 0,4

8 — 170,40 — 170,40 — 170,40 — 170,40

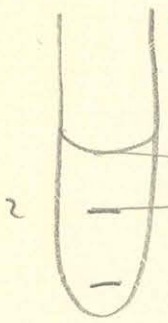
147,96 — 148,10 — 148,12 — 148,12

86

1 — 30,34? — 30,54 — 30,54 — 30,54

t = 14,9 - 0,4

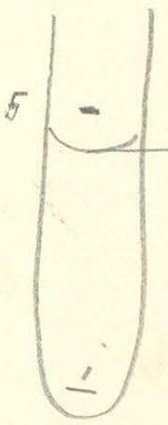
I. kánni cső



2 — 64,34 64,36 64,38
— 56,78 56,30 56,30
,06

$t = 15,0 - 0,4$

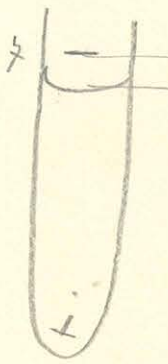
II. kánni cső



5 — 96,80 96,80 96,82
90,50 90,50 90,52

$t = 15,0 - 0,4$

III. kánni cső



4 — 93,74 93,74 93,74
91,56 91,56 91,58

$t = 15,1 - 0,4$

edény kitágulási 14°6. és 100° hőmérséklet

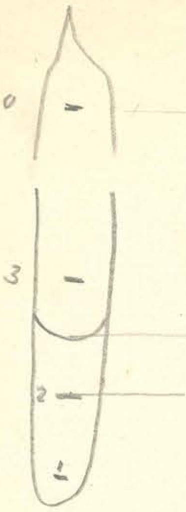
I $l_{14,6} = 180,01$ $l_{100} = 180,22$ $\frac{21}{18000}$

II $l_{14,6} = 159,94$ $l_{100} = 160,12$ $\frac{18}{16012}$

III $l_{14,6} = 139,84$ $l_{100} = 139,94$ $\frac{10}{139\,24}$

I kamrai cső

1



10	253, 38	253, 38
	103, 44	103, 45
2	93, 26	93, 26
	10, 18	10, 19

[illegible] thermometer 100,1

9,12

II kamrai cső

9	186, 56	186, 64	186, 62
	111, 92	111, 92	111, 94
5	106, 52	106, 58	106, 60
		5, 34	5, 34
2	46, 44	46, 44	46, 44

[illegible] thermometer 100,7

20

III. kamrai cső

Temp. 100°8

	162,26	162,24	162,26
7	143,64	143,62	143,62
	18 62	18,62	18,64
2	43,70	43,72	
1	23,70	23,70	

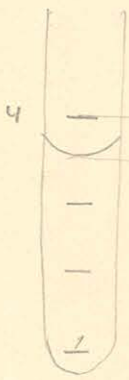
I. számú cső

Alkohol ρ = 0,797.

benne 1 cm³ alkohol

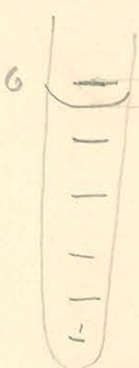
53,66	53,68	53,70
48,16	48,18	48,18
5 50	5 50	5,52

1 cm³ alkohol



57,12	57,14	57,12
53,88	53,90	53,90
3,24	3,24	3,22

3 cm³ alkohol

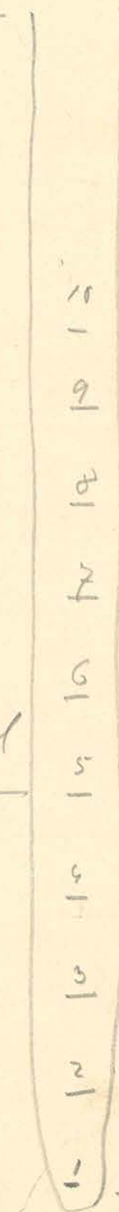


58,28	58,30	58,28
57,30	57,30	57,30
0,98	1,0	98

5 cm³ alkohol

57,68	57,66	57,66
56,48	56,50	56,48
1 20	1 16	1 18

7 cm³ alkohol



- 10 — 177,97
- 9 — ~~15,~~ 157,99
- 8 — 138,0
- 7 — 118,02
- 6 — 98,02
- 5 — 78,01
- 4 — 58,05
- 3 — 38,03
- 2 — 17,99
- 1 — −2,11

~~56,62 56,52 56,52 56,40~~

~~54,22 54,23 54,22 54,21~~

56,36	56,36
54,26	54,26
~~1,10~~ 2,10	2,10

8 cm³ alkoh.

t = 18,0

II. sorozat

58, 54 58, 52 58, 52
54, 38 54, 40 54, 38
4,16 4 12 4 14

1 cm³

60, 38 60, 38 60, 38
60, 04 60, 04 60, 05
24 24 22

3 cm³

61, 64 61, 64 61, 65
58, 22 58, 21 ~~58~~, 22
3, 42 3 43 3, 43

5 cm³

~~145, 50~~ 166,38
~~155, 47~~ 146,36
~~135, 45~~ 126,40
~~115, 42~~ 106,42
~~95, 41~~ 86,38
66, 36
46, 36
} 56,34
6,42

57, 90 57,92 57,92
50, 76 50,76 50,78
7,14 7,16 7 16

7 cm³

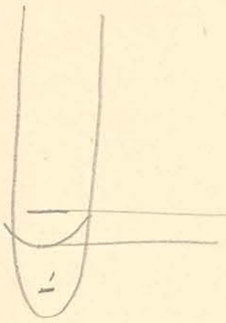
51,00 50,98 51,00
42,20 42,19 42,20

8 cm³

t = 18,8

III számú cső

1 cm³ alkohol



~~57,32 57,33 57,32~~
~~53,42 53,40 53,42~~

6,38

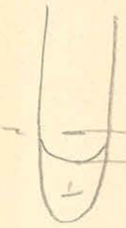
6,36

6,40

6,42

6,38

IV. számú cső



58,92	58,92	58,94
54,83	54,84	54,84
4,09	4 08	4 10

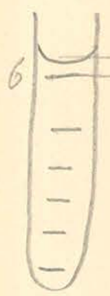
1 cm³

$\frac{2}{42,51}$

61,84	61,84	61,84
60,28	60,26	60,26
	1,58	1,58

3 cm³

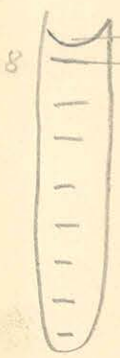
$\frac{2}{42,56}$



102,64	102,66	102,66
101,66	101,68	101,68
0,98	0,98	0,98

5 cm³

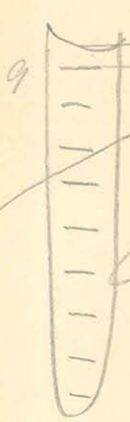
$\frac{2}{42,48}$



58,26	58,26	58,26
54,80	54,78	54,78
3 46	3 48	3 48

7 cm³

$\frac{1}{21,24}$ $\frac{2}{42,48}$



~~79,54 79,84 79,52~~
~~74,84 74,84 74,83~~
~~4 70 4 70 4 81~~

8 cm³

1 cm³ osztással

(törés és beforrasztás előtt) | beforrasztás után

	törés és beforrasztás előtt	beforrasztás után	
	215,64		
	195,60		
8	175,60	163,86 / 164,08	163,86 / 164,08
7	155,56	143,80 / 144,04	143,78 / 144,04
6	135,53	123,79 / 124,02	123,78 / 123,97
5	115,52	103,89 / 104,04	103,78 / 104,00
4	95,52	83,90 / 84,08	83,82 / 84,03
3	75,52	63,90 / 64,06	63,83 / 64,01
2	55,49	43,90 / 44,12	43,83 / 44,00
1	35,70	23,94 / 24,14	23,94 / 85 / 44,04

1979
32
71

20,05	20 06	20,08	20,04	20,04
20,02	20 01	20,00	20,02	20,04
19,99	19 90	20,00	19,98	20,07
19,98	19 99	20,00	19,96	19,97
19,99	20 00	19,96	20,02	19,97
19,99	20,00	19,99	19,94	20,02
19,99	19,96	20,00	19,98	20,01

Mérések 4.

<u>Acetyléter glycerinben.</u>

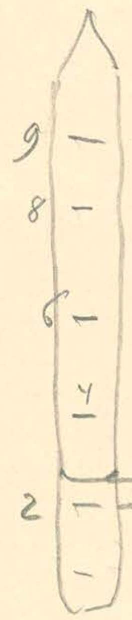
~~100~~ fekete thermometer

I cső

1

190°-nál egészen gőzzé válik (még nem hűtöttem)

Tegy. 150,5.



~~182,0~~ 182,0

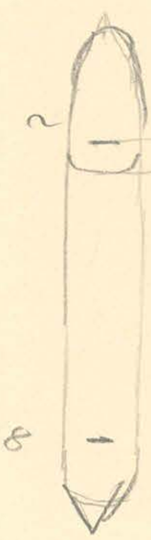
46,00 45,98

41,76 41,70 41,76.

Milyen nagy nyomás! Közel 1 m.m.

<u>III számú cső</u>

150,5.



150,5

~~192,54~~ 192,28 192,26 192,52 192,56 192,34

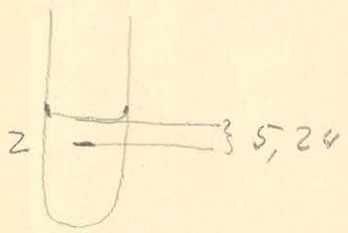
~~185,60~~ ~~185,52~~ 185,58 185,63 186,0

172,36 172,30 171,98 ~~172,34~~

I csö lelütve

Hőmérséklet −84°C.

Meniscus 498

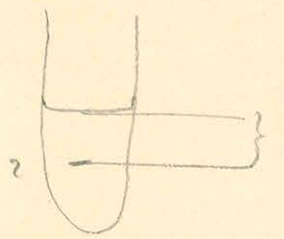


Hőmérs. −78°C

Meniscus 495

Hőmérs −74°C

Meniscus 481



3. ~~1~~ számú cső = 27,163 gr

Üvegcső

8,8
9,0
9,2
9,00

11,0
10,7
10,85

$\frac{19,85}{2}$ = 9,98 = Egész

Suffal

9,05
9,2
9,4
9,22

10,1
10,0
10,05

$\frac{19,27}{2}$ = 9,69 = Eg.

Mérlegen 27,16 gr

$\frac{0,29}{1,1}$ = 0,3

2 számú cső = 25,990

Üvegcső

10,2
10,5
10,35

12,4
12,0
11,8
12,07

$\frac{22,42}{2}$ = 11,21 = Egész

Suffal –

10,0
10,3
10,5
10,27

12,3
12,1
12,20

$\frac{22,47}{2}$ = 11,24 = Egész

Mérlegen 25,990 gr.

Suffal

9,9
10,4
11,0
10,43

15,0
14,4
14,60

16,00 gr

$\frac{0,03}{1,28}$ = 0,02

~~$\frac{24,92}{2}$ = 12,46~~
11,24
1,2

$\frac{25,03}{2}$ = 12,52
11,24
1,28

0,01 gr. = 1,3 osztásrész

~~3. cső súlya = 27,163 gr~~
2. cső súlya = 25,990
1. cső súlya = 36,517

I mann cso + netter = 37,699 gr.

Uvej cso + netter

8,8 12,0
9,2 11,6
9,6 11,80

Luffal

10,1 11,2
10,2 11,1
10,2 11,15
10,17

Medtyv. 37,70 gr.

$\frac{21,32}{2} = 10,66$ · $\frac{0,16}{1,1} = 0,1$

9,70 $\frac{21,00}{2} = 10,50$

II cso + netter. = 28,617 gr.

Uvej cso + netter

9,9 12,8
10,2 12,6
10,4 12,70
10,17

10,6 13,4
10,9 13,1
11,1 13,75
10,87

Medtyv: 28,62 gr.

$\frac{22,87}{2} = 11,44$

$\frac{24,12}{2} = 12,07$

$\frac{0,37}{1,3} = 0,3$

I cso + netter = 37,699 gr.
I cso = 36,517
1,182 gr.

II cso + netter = 28,617 gr.
25,990
2,627

I cso ten netter = 1,187 gr.
II cso ten " = 2,627 gr.
III cso ten netter = 4,184 gr.

$\frac{17,33}{2} = 8,67$

Izzani cső súlya = 35,559

Üvegcső

7,4
7,6
7,9
7,63

9,8
9,6
9,70

8,67 = Sup

Lúffal

7,9
8,1
8,2
8,07

9,6
9,4
9,50

$\frac{17,57}{2} = 8,79$

Merge 35,56

$\frac{0,12}{1,2} = 0,1$

Izzani cső + cutter = 39,743 gr.

Konon

~~11,2~~
10,5
10,8
11,0
10,78

~~12,5~~
12,0
11,8
11,90

$\frac{22,68}{2} = 11,34$

10,5
10,6
10,7
10,60

11,5
11,3
11,40

$\frac{22,00}{2} = 11,00$

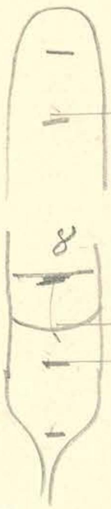
Üvegen 39,74

$\frac{0,34}{1,1} = 0,3$

39,743
35,559
4,184 = Cutter súlya.

I számú cső benne 1,182 gr. aether.

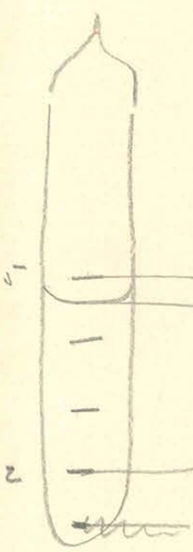
97,16	97,18	97,22	97,18	97,18	97,18
89,22	89,22	89,24	89,24	89,22	89,22
7,94	7,96	7,98	7,94	7,96	7,96



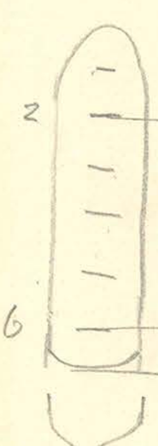
225,12	225,12	225,14	225,14	225,16	
134,74	134,72	134,72	134,72	134,72	
90,38	90,40	90,42	90,42	90,44	t=15,9-0,4
85,08	85,04	85,04	85,06	85,06	
5,30	5,36	5,38	5,36	5,38	

19,98
5 36
14,62

II számú cső benne 2,627 gr. aether.

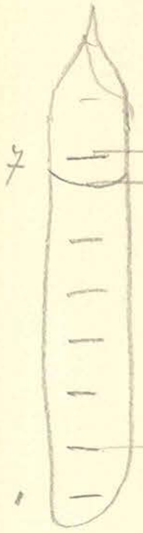


103,44	103,44	103,44	103,44	
97,24	97,26	97,24	97,24	
6,20	6,18	6,20	6,20	t= 15,9-0,4
43,40	43,40	43,42	43,40	



214,30	214,28	214,28	214,26	
134,32	134,32	134,32	134,30	t=16,0-0,4
123,28	123,30	123,30	123,28	
11 4	11 2	11 2	11 2	

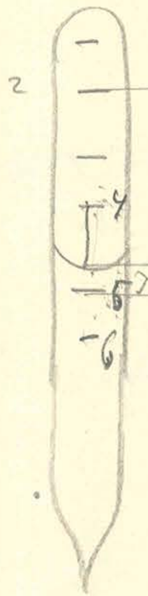
III számú cső benne 4,184 gr. aether.



140, 34   140,34   140,32   140,34
138, 16   138,18   138,18   138,20

2 18   2 88   2 14   2,14 – 2,16

40, 34   40,34   40,34   40,36



154, 06   154,06   154,06   154,06

102, 06   102,04   102,04   102,04   t = 15,8 – 0,4
94, 06   94,06   94,06   94,06

08,00   7,98   7,98   7,98

12,02.

Légnyomás: 750,9 mm.

12,0