Ms 5099/18. Eötvös Loránd jegyzetei. Gravitáció

Gravitatio és földi mag-
nesség közötti összefüggésre
vonatkozó vizsgálatok

Gravitáció

és

földmágnesség

1901

Schlunderbach

$$X = \alpha \frac{\partial^2 V}{\partial x^2} + \beta \frac{\partial^2 V}{\partial x \partial y} + \gamma \frac{\partial^2 V}{\partial z \partial x}$$

$$Y = \alpha \frac{\partial^2 V}{\partial x \partial y} + \beta \frac{\partial^2 V}{\partial y^2} + \gamma \frac{\partial^2 V}{\partial z \partial y}$$

$$Z = \alpha \frac{\partial^2 V}{\partial x \partial z} + \beta \frac{\partial^2 V}{\partial y \partial z} + \gamma \frac{\partial^2 V}{\partial z^2}$$

X, Y, Z tengelyeinek $\varphi = 0$ $\lambda = 0$ -on és
xyz φ és λ pontban is

$\cos(x,X) = +\cos\varphi$

$\cos(y,X) = -\sin\varphi \sin\lambda$

$\cos(z,X) = +\sin\varphi\cos\lambda$

$\cos(y,X) = 0$

$\cos(y,Y) = +\cos\lambda$

$\cos(y,Z) = +\sin\lambda$

$\cos(x,Z) = -\sin\varphi$

$\cos(y,Z) = -\cos\varphi\sin\lambda$

$\cos(z,Z) = +\cos\varphi\cos\lambda$

A, B, C, a momentumok összetevői x, y, z tengelyekre vonatkozólag

$\alpha = A\cos\varphi - B\sin\varphi\sin\lambda + C\sin\varphi\cos\lambda$

$\beta = B\cos\lambda + C\sin\lambda$

$\gamma = -A\sin\varphi - B\cos\varphi\sin\lambda + C\cos\varphi\cos\lambda$

ha dő hőpolításban tekintve $\frac{\partial^2 V}{\partial x \partial y}, \frac{\partial^2 V}{\partial x \partial z}, \frac{\partial^2 V}{\partial y \partial z} = 0$ és

$$\frac{\partial^2 V}{\partial x^2} = \frac{\partial^2 V}{\partial y^2} = -\frac{1}{2}\frac{\partial^2 V}{\partial z^2} = -\frac{1}{2}F = -\frac{1}{2}\frac{g_0}{f}\left(\frac{1}{\varrho_1} + \frac{1}{\varrho_2}\right) = \cancel{+\tfrac{1}{2}46} = -\frac{1}{2}\,46{,}0 \quad \text{C.G.S.}$$

$X = -23(A\cos\varphi - B\sin\varphi\sin\lambda + C\sin\varphi\cos\lambda)$

$Y = -23(B\cos\lambda + C\sin\lambda)$

$Z = +46(-A\sin\varphi - B\cos\varphi\sin\lambda + C\cos\varphi\cos\lambda)$

ezekből

$$\left\{\begin{aligned} A &= -\frac{1}{23}\cos\varphi\, X - \frac{1}{46}\sin\varphi\, Z \\ B &= +\frac{1}{46}(2\sin\varphi\, X - \cos\varphi\, Z)\sin\lambda - \frac{1}{23}\, Y\cos\lambda \\ C &= -\frac{1}{46}(2\sin\varphi\, X - \cos\varphi\, Z)\cos\lambda - \frac{1}{23}\, Y\sin\lambda \end{aligned}\right.$$

számítva

$$-46A = H\cos\varphi\,(2\cos\delta + \operatorname{tg} i\operatorname{tg}\varphi)$$

$$-46B = H\cos\varphi\,(\operatorname{tg} i - 2\cos\delta\operatorname{tg}\varphi)\sin\lambda + 2H\sin\delta\cos\lambda$$

$$+46C = H\cos\varphi\,(\operatorname{tg} i - 2\cos\delta\operatorname{tg}\varphi)\cos\lambda - 2H\sin\delta\sin\lambda$$

100 Nyugat
[illegible]

φ	cos φ	tg φ	i	tg i	u	
70						0,658
60	0,500	1,732	85°	11,430	0,060	~~0,503~~ ~~1,194~~ 0,662
40	0,766	0,839	67°	2,356	0,218	0,665
20	0,940	0,364	48°	1,111	0,330	0,744
0	1,00	0,000	12°	0,213	0,355	0,710
-20	0,940	0,364	31°	0,601	0,315	0,657.
-40	0,766	0,839	51°	1,235	0,275	0,638
-60	0,500	1,732	67°	2,356	0,250	~~0,489~~ 0,510 0,72.

$\sqrt{570} = 755$

100 kelet.

$J^2(1+3\cos^2 i)$

φ	cos φ	tg φ	i	tg i	u		$u^2(4+tg^2 i)$
70	~~0,500~~ 0,342	2,747	80°	5,671	0,09,5	0,601	
60	~~0,766~~ 0,500	1,732	74°	3,487	0,15	0,659	
40	~~0,940~~ 0,766	0,839	57°	1,540	0,29	0,730	
20	0,940	0,364	29°	0,554	0,37	0,765 =	0,589
0	1,00	0,000	-20°	-0,364	0,38	0,760	
20	0,940	0,364	-57°	-1,235	0,30	0,691	
40	0,766	0,839	-70°	2,747	0,20	0,659	
60	0,500	1,732					

20 kelet

	cos φ	tg φ	i	tg i	u		$u^2(4+tg^2 i)$
70	0,342	2,747	76°	~~2,246~~ 4,01	0,120	~~0,230~~ 0,533	
60	0,500	1,732	70°	~~1,732~~ 2,75	0,140	~~0,400~~ 0,54	0,300
40	0,766	0,839	58°	1,376	0,250	0,604	0,369
20	0,940	0,364	22°	0,404	0,320	0,645	0,424
0	1,00	0,000	-22°	-0,404	0,300	0,600	0,3,75
20	0,940	-0,364	-46°	-1,036	0,280	~~0,469~~ 0,514	
40	0,766	-0,839	-57°	-1,540	0,190	0,554	
60	0,500	-1732	-65°	-2,145	0,180	0,513	

180°

φ	$\cos\varphi$	$\operatorname{tg}\varphi$	i	$\operatorname{tg} i$	H	
70°	0,342	2,747	78°	4,705	0,110	0,564
60°	0,500	1,732	70°	2,748	0,18	0,608
40°	0,766	0,839	52°	1,280	0,255	0,601
20°	0,940	0,364	30°	0,577	0,315	0,652
0°	1,00	0	-10°	0,176	0,36	0,720
20°	0,940	-0,364	-42°	0,900	0,34	0,746
40°	0,766	-0,839	-64°	2,050	0,22	0,625
60°	0,500	-1,732	-77°	4,331	0,14	0,485 ?

Számítás a gravitatiós mágn. momentum meghatározására

X észak felé
Y Kelet felé
Z lefelé

1

Gravitatiós rész

gyújó érték ált 1 osztály rész kitérésnek megfelelő erő a tömegegységre = 5,455 f.

teszem $V = s\,\Omega$ akkor.

I pontra $s\dfrac{\partial^2\Omega}{\partial x\partial y} = -0{,}878$ $s\dfrac{\partial^2\Omega}{\partial y^2} = +3{,}273$ $s\dfrac{\partial^2\Omega}{\partial y\partial z} = \cancel{-3{,}959}$

kiból $= -4{,}232$

II pontra $s\dfrac{\partial^2\Omega}{\partial x\partial y} = -1{,}145$ $s\dfrac{\partial^2\Omega}{\partial y^2} = +6{,}000$ $s\dfrac{\partial^2\Omega}{\partial y\partial z} = -0{,}709$

III pontra $s\dfrac{\partial^2\Omega}{\partial x\partial y} = -3{,}679$ $s\dfrac{\partial^2\Omega}{\partial y^2} = +3{,}052$ $s\dfrac{\Omega^2}{\partial y\partial z} = -0{,}300$

Mágneses rész

Keleti Componens Y

Horizontal intensitás = 0,219

~~Kosztány~~ =

Torsió miatt kitérések 4%-al szorzatikkal megjavítandók.

I pontra
$Y = -0{,}00926$

II pontra
$Y = -0{,}00469$

$Y = +0{,}00293$.

Első gyakorlás

$$y = \alpha \frac{\partial^2 \Omega}{\partial x \partial y} + \beta \frac{\partial^2 \Omega}{\partial y^2} + \gamma \frac{\partial^2 \Omega}{\partial z^2}$$ egyelet írható

a hol α β γ a kis golyóság momentumai / tehát $\alpha' = \frac{\alpha}{s}$ $\beta' = \frac{\beta}{s}$ $\gamma' = \frac{\gamma}{s}$

és ezután α' β' γ' a tömegység momentumai. lesz

I pontra ---- $0{,}00926 = 0{,}818\,\alpha' + 3{,}273\,\beta' + \underset{\text{hibás, ehelyett } 4{,}232\,\gamma'}{\cancel{3{,}959\,\gamma'}}$

II pontra $0{,}00469 = 1{,}145\,\alpha' + 6{,}000\,\beta' + 0{,}709\,\gamma'$

III pontra $-0{,}00293 = 3{,}679\,\alpha' + 3{,}052\,\beta' + 0{,}300\,\gamma'$

ebből a három egyenletből

$\alpha' = -0{,}001686$

$\beta' = -0{,}000905$

$\gamma' = +0{,}001932.$

hibás a jó I egyenletben γ' együtthatója 4,232 ehelyett

$\alpha' = -0{,}0016808$

$\beta' = -0{,}0008865$

$\gamma' = +0{,}0018273$

próbáltam el.

Javítani a horizontalis inklinációs nem 0,219

hanem $\frac{26{,}7}{25{,}5}\,0{,}219$ e szerint

I pontra $y = 0{,}00969$

II pontra $y = 0{,}00491$ és

III pontra $y = 0{,}00307$

$\alpha' = -0{,}001760$

$\beta' = -0{,}000929$

$\gamma' = +0{,}001913$

Mágneses variométer érzékenység kiszámítása.

$h = 0{,}15$ ad a bajítás 1,25 osztálynyi ingadozást:

Bajítás alatt

északi felé — Keleti felé — lefelé

$-24{,}6$ — $-10{,}7.$ — $+21{,}5$ osztályzás

$$\overline{c = 13{,}58\ 10^{6}}$$

Legyen Magnesre:

elhelyezett hossza 28 cm

északi irányra

$$72 = c\,\frac{2345}{145^{4}} \qquad \left(\frac{1}{56^{3}} - \frac{1}{84^{3}}\right) = 0{,}000004600$$

$$-24{,}6 = 2c.\,\mu_x \frac{1}{3}\left(\frac{1}{56^{3}} - \frac{1}{84^{3}}\right)$$

Keletre $\quad -10{,}7 = 2c\,\mu_y$

lefelé

így tehát $\mu_x = -16{,}55 \mid \mu_y = -9{,}61 \quad \mu_z = +19{,}30$

Keletre és lefelé hasonló formula.

$$-10{,}7 = 2c.\,\mu_y \frac{1}{70^{4}}\left(1 - \frac{5}{12}\cdot\frac{0{,}4^{2}}{45}\right) \cdot$$

a bajolat súlya $= 9700$

e szerint mágneses Variométernek

$$\alpha' = \frac{\alpha}{\delta} = -17{,}06 \quad \beta' = \frac{\beta}{\delta} = -9{,}91 \quad \gamma' = \frac{\gamma}{\delta} = 19{,}90$$

$$\alpha' = \frac{\alpha}{\delta} = -0{,}001706 \quad \beta' = \frac{\beta}{\delta} = -0{,}000991$$

$$\gamma' = \frac{\gamma}{\delta} = -0{,}001990$$

Nagyon jól van

Gravitatiós magneses momentum meghatározása.

Súly közepe 5 centiméterrel kitérve, 3,3 centiméterrel feljebb mint I. pont.

$\delta x = 0 \quad \delta y = 0 \quad \delta z = +1,0\,C.$

1902
Jun 24 este

7h. 21m ... 222,15 $l = 11^{\circ}2$
29m 222,15 ... egyensúly 222,15

$\delta x = 0 \quad \delta y = 0 \quad \delta z = +1,0\,C.$

7h. 36m 223,0 x
47m 219,85 x) 3,15
58m 221,0 x) 1,15
egyensúly 220,70

$\delta = 0 \quad \delta y = 0 \quad \delta z = -1,0\,C$

Kitérés = 1,45 osztályrész

este 9h. 7m 222,15

Középérték = 221,43.
egyensúly 222,15

$\delta x = +1,0\,C \quad \delta y = 0 \quad \delta z = 0$

este 9h 14m 222,8 x himbál
23m 220,6 x jó
34m ... 221,6 x
45m 221,25 x
egyensúly 221,35

$\delta x = -1,0\,C. \quad \delta y = 0 \quad \delta z = 0$

Kitérés = 0,30

9h. 48m 221,2 x himbál
" 59m 221,85 x
10h 10m 221,60 x
egyensúly 221,65

$\delta x = +1,0\,C \quad \delta y = 0 \quad \delta z = 0$

Középérték 221,50

10h 18m 221,20 x
29m ... 221,40 x

$l = 11^{\circ}2$
egyensúly = 221,35

$\delta x = 0$ $\underline{\delta y = +1{,}0\,c}$ $\delta z = 0$

Június 24 este 10 h. 33 m 221,6 ×
44 m 220,6 ×
55 m 221,05 × egyensúly 220,95

$\delta x = 0$ $\underline{\underline{\delta y = -1{,}0\,c}}$ $\delta z = 0$

Kitérés 1,20

11 h. 4 m 222,55 ×
15 m 221,95 × egyensúly 222,10

$\delta x = 0$ $\underline{\delta y = +1{,}0\,c}$ $\delta z = 0$ Középállás = 221,50

11 h. 27 m 220,45 × egyensúly 220,85
38 221,00 ×

Június 25 - én reggel 8 h 10 m 222,00 áll $t = 10^0$

Súly ráégve 5 C. Kelekor 3,3 Centrumel felső mint II pont.

vigyázz! mint hiba daráron hogy a $\delta z = +1{,}0\,c$ - nál kisebb és ... felső

$\delta x = 0$ $\delta y = 0$ $\underline{\delta z = -1{,}0\,c}$.

r. 9 h. 6 m 220,7 ×
17 m 219,7 × egyensúly 219,92
28 m 200,0 × $t = 10^0 2$

$\delta x = 0$ $\delta y = 0$ $\underline{\underline{\delta z = +1{,}0\,c}}$.

9 h 36½ 220,5 ×
" 47 m 219,3 × egyensúly 219,60
58 m 219,7 × $t = 10^0 15$

$\delta x = 0$ $\delta y = 0$ $\underline{\underline{\delta z = -1{,}0\,c}}$. Kitérés 0,26

Közép 219,70

10 h. 6½ 222,35 ×
18 m 218,80 ×
29 m 200,20 × egyensúly 219,83
40 m 219,70

$\delta x = 0$ $\delta y = 0$ $\underline{\underline{\delta z = +1{,}0\,c}}$.

10 h. 52 m 220,15 ×
11 h 3 m 219,35 × $t = 11^0 25 - 11^0 30$
" 13 m 219,60 × egyensúly 219,54

$\delta x = +1,0$ C. $\delta y = 0$ $\delta z = 0$

11h. 20m 220,3 × egyensúly = 219,42
31m 219,2 × $t = 10°25$
42m 219,5 ×

középérték = 219,66

$\delta x = -1,0$ C $\delta y = 0$ $\delta z = 0$

11h. 57 -től 12h. 2-ig 219,95
12h 10m -től 12h 12-ig 219,85 egyensúly 219,87

$\delta x = +1,0$ C. $\delta y = 0$ $\delta z = 0$ kitérés = 0,42

12h. 21m 219,35 $t = 10°2$ egyens. 219,47
31m 219,52

$\delta x = 0$ $\delta y = -1,0$ C $\delta z = 0$ y Keletre pozitív

12h 32m 219,55 × $t = 10°15$
44m 218,25 × egyensúly = 218,62
55 218,75 ×

középérték 219,7

lökést meglöktem $\delta x = 0$ $\delta y = +1,0$ C. $\delta z = 0$

1h 6m ... 221,60 × egyensúly = 220,80
17m 220,60 × $t = 10°1$

$\delta x = 0$ $\delta y = -1,0$ C $\delta z = 0$ kitérés 2,20

18m 220,60 × egyensúly = 218,57
~~30~~ 29m ~~217~~ 217,90 × $t = 10°1$
41m 218,8 ×

Súly középe 5 Centiméterrel Keletre 3,3 C. feljebb mint 3 pont, beállítás után csak a kötéseket meglöktem

$\delta x = +1,0$ C. $\delta y = 0$ $\delta z = 0$ középérték 222,48

1h. 49m 226,75 × hinta bél
2h. 0m 221,10 × hintabal $t = 10°05$
3h. 0m 222,8 × egyensúly 222,8

$\delta x = \cancel{+}1,0$ C $\delta y = 0$ $\delta z = 0$ kitérés = 1,35

4h. 15m 224,15 $t = 10°05$ egyens. 224,15

$\delta x = +1,0$ C $\delta y = 0$ $\delta z = 0$ középérték ~~kitérés 1,85~~

0. 4h 27m 222,2 × egyensúly 222,80
38m 223,0 ×

$\delta x = 0$ $\delta y = +1{,}0\,c$ $\delta z = 0$

4 h. 40 től 4 h. 50 ig 222,95 egyensúly 222,95.

$\delta x = 0$ $\delta y = -1{,}0\,c$ $\delta z = 0$

5 h. 2 m 224,4 × egyensúly = 224,1
13 m 224,0 × $t = 10^\circ 05$
kitérés 1,12

$\delta x = 0$ $\delta y = +1{,}0\,c$ $\delta z = 0$ középs = 223,5
25 m 222,65 × egyensúly 223,02
38 m 223,15 ×

Az is feldíttett kitérés

$\delta x = 0$ $\delta y = 0$ $\delta z = -1{,}0\,c.$
5 h. 42 ½ 224,0 ×
55 m 223,4 × egyensúly = 223,63

$\delta x = 0$ $\delta y = 0$ $\delta z = +1{,}0\,c$ középs = 223,75
6 h. 3 m ½ 224,65 ×
15 m 223,20 × egyensúly 223,64
26 m 223,80 × kitérés 0,11

$\delta x = 0$ $\delta y = 0$ $\delta z = -1{,}0\,c.$
6 h. 43 223,55 × egyensúly = 223,88
54 224,00 × $t = 10{,}05$

Érzékenység közönséges golyóval. Golyó súlya = 13135 gr. sugara = 6,5
Távolság = 2,3 + 1,5 + 6,5

Üresen
7 h. 0 m 30 s 222,3 ×
12 m 0 s 231,7 × 9,4
23 m 30 s 228,35 × 3,35
229,6 1,25
egyensúly 229,26

7 h. 47 m 20 s 198,1 × 11,45
59 m 0 209,55 ×
8 h 10 40 205,35 ×
9 h 27 m 206,6 áll
$t = 10^\circ 05$

Üresen
d. u. 10 h. 16 m 229,0 ×
17 m 229,45 ×
$t = 9^\circ 95$
egyensúly 229,33

Temperatur Correctio egyensúlyhelye mérése

Jun 26 r. 8 h. 30 m	230,25	$t = 9^\circ 5$
?	225,60	$t = 16^\circ 0$
1 h. 26 m	223,70	$t = 18^\circ 4$
4 h 5 m	223,20	$t = 19^\circ 6$
est 7 h. 28 m	222,6	$t = 21^\circ 4$
est 8 h. 50	224,6	$t = 19^\circ 6$
Jun 27 r. 7 h. 45	229,7	$t = 15^\circ 4$
Jun 27 este 8 h 22	231,0	$t = 11^\circ 2$
28 reggel 9 h. 0 m	232,4	$t = 10^\circ 0$
Jun 29 d. u. 4 h 0	232,7	$t = 8^\circ 5$

Gravitatiós mágnesek momentuma. Mágnes rész

Mágneses rész 1902 Június 25 este K. Pekárral.

1) Horizontalis intenzitás és elektr. helyen

Magnetometeren Kitérés = 25°9

Egyensúly ... alatt Ml = 0,213 ad 26°7 ...

2) ~~Érzékenység~~ Torzió viszony

Magnetometer skála 2 millimeter

Skála távol = 194,0 Cm.

nem tordálva { 230,4 / 233,0 / 231,2 / 233,0 / 231,0 / 233,0 / 230,7

30 fokkal tordálva { 254,8 / 258,0 / 256,0 / 257,0 / 256,1 / 257,2 / 256,2

3) ~~Mágneses hatás~~

I pont. Üres { ~~248,2 / 250,2 / 248,8 / 250,1~~ / 248,1

Bajolt az (?) ... { 175,7 / 179,3 / 175,7 / 177,2 / 175,1

Üres { 255,3 / 5,9 / 6,1 / 7,2

{ 5,0 / 6,9 / 5,3 / 7,2 / 5,8

Bajolt { 180,6 / 181,8 / 180,7 / 181,8 / 180,8

II pont Üres { 258,7 / 9,0 / 8,8 / 259,0

Bajolt { ~~239,7 / 240,1 / 239,8 / 240,1~~ / 239,9

Üres { 256,8 / 258,1 / 256,8 / 258,2 / 256,8

~~Bajolt~~ { 216,0 / 219,0 / 216,2 / 219,0 / 216,3

Üres { 255,1 / 258,8 / 255,3 / 258,8 / 255,0

Bajolt { 206,8 áll

Üres { 246,1 / 8,0 / 6,2 / 7,9 / 6,3

Bajolt { 208,9 áll

Üres { 246,3 / 251,3 / 247,0 / 251,8 / 247,2

III pont

Bajolt { 272,8 áll

Üres { 248,8 áll

Bajolt { 276,7 áll

Üres { 253,4 áll

Bajolt { 277,1 áll

Üres { 251,1 áll

4) Mérések Magyar Variométerrel

Üresen 9 h. 17½ m 247,0 ×) 2,8
25 m 244,2 ×

egyensúly 244,9

É.

Északon 70 centiméterre egy hasáb.

~~[illegible]~~ő északi vége

Északon felső él

9 h. 34 m 30^s 225,4 ×) 6,2
42 m 231,6 ×) 2,4 δ = 0,284
− 14,9 49½ 229,2 egyensúly 230,1

Északon alsó él.

9 h. 57½ m 275,0 ×) 16,7
+ 17,7 10 h. 5 258,3 ×) 6,0 δ = 0,260
" 12½ 264,3 × egyensúly = 262,7

Teteje felső él

Hasáb északi vég északon

10 h. 26 m 20 209,7 ×) 15,4
34 m 0 225,1 ×) 5,7 δ = 0,278
− 24,1 41 m 30^s 219,4 × egyensúly = 220,9

~~Déli vég~~ Északi vég délről

+ 25,0 11 h. 5 m 20^s 273,1 × egyensúly 270,0
13 m. 268,8 ×

Üresen

21 m 20^s 236,7) 12,1
29 m. 248,8 egyensúly 245,5

Bugyáki északi vége Keletre.

	11 h.	39m	261,0 ×	
+12,1		46½	255,8 ×	
		54 m	257,6	Egyensúly = 257,1

Bugyáki északi vége nyugatra.

	12 h.	3m	226,6 ×	
		10m 30	238,7 ×	
−9,7		18m	234,0 ×	Egyensúly = 235,3

Üresen

1 h. 24 m 244,8

Június 27. r. 9 h 10 m 245,6 üresen

felül felső él

északi vég nyugatra.

Diff	9 h	15½m	233,0 ×	
−9,3		23 m.	238,0 ×	Egyensúly 236,6

északi vég Keletre.

	9 h.	30½m	263,9 ×		
Diff. +12,1		38 m	254,3 ×	) 9,6	Egyensúly 257,9
		45½m.	257,8 ×	) 3,5	

Üresen

10 h.	23 m	246,1 ×	
	30	246,1	Egyens. 246,1

Alsó ingában h = 1,5 cm

Toldalék a gravitatiós részhez.

A gravitatiós eszközön [illegible] ülőkének új meghatározása

Eszköz üresen Június 28ikán r. 10 h. 10 m .. 231,2 $t = 10^{\circ}0$

22 m. 231,15

golyó oda téve 10h 20 m: 2,3 + 4,5 + 6,5 = 13,3 cm távolságra } 12 h. 48 m .. 217,6 $t = 10^{\circ}0$

12 h. 58 217,6

üres este 6 h 50 231,55 $t = 9^{\circ}5$

redukálva 10°ra 231,15

Magneses Variometer június 29ikén

r. 7 h. 45 üres 244,4

bizmutfelső éle felül északi vég északon.

	7 h. 56½	212,0 x		
	8 h. 4 m	222,6 x	11,6	
Kitérés 25,0	8 h 11 m	218,4 x	½ 2 közép 219,6	
			diff = 24,8	

üres 244,4

északi vég délről 271,3 diff + 27,0

üres 244,3

~~felül~~ északi vég

északon ~~felső él~~ 227,6 diff. − 16,6

üres 244,0

~~felül~~ északon alsó él 260,6 diff + 16,5

üres 244,2

~~0,15 horizontális [illegible]~~

2345 momentumú mágnes felül 145 cm-re 72 [illegible] alatt.

		[illegible]	X (B-K) III	-Y (B-K)	Z (B-K)
1.	Seesen		+0,00 050	-0,00 027	+0,00 116
	Schildberg	+3,8			
4.	Clausthal		- 046	- 026	- 078
5	Zellerfeld	+2,6	- 067	- 020	- 084
6	Altenau		- 022	- 019	- 111
	Lerchenköpfe	+8,0			
13	Brocken	+8,4	- 053	- 021	- 060
	Achtermannshöhe	+1,3			
	Hüttenrode	+6,3			
23	Elbingerode		- 008	+ 027	+ 055
	Victorshöhe	+3,9			
31	Mägdesprung		+ 011	- 022	+ 150
36	Ballenstedt		- 054	- 006	+ 078
	Greifenhagen	+3,2			
	Belleben	+2,8			
39	Mansfeld	+1,1	- 027	+ 011	+ 126
		$+\frac{41,4}{10}=+4,14$	$-\frac{216}{9}=-24.10^{-5}$	$-\frac{103}{9}=-11.10^{-5}$	$\frac{+191}{9}=+21.10^{-5}$

IV

3	Osterode	-0,9	-0,00 030	-0,00 004	+0,00 071
8	[illegible]		- 025	- 036	- 080
9	Andreasberg	-2,8	- 032	- 028	+ 080
	Gr. Knollen	-4,7			
	Hohegeiss	-2,2		~~+ 028~~	
21	Benneckenstein		- 042	+ 028	+ 023
24	Hasselfelde	+1,6	- 034	- 004	+ 129
32	Güntersberge	~~[illegible]~~	- 024	+ 014	+ 064
	Josephshütte	-4,7			
	Harzgerode	+3,4			
38	Wippra		+ 035	+ 037	+ 190
42.	Eisleben		- 054	+ 028	+ 033
		$-\frac{10,3}{7}=-1,47$	$-\frac{216}{8}=-27.10^{-5}$ -27.10^{-5}	$+\frac{35}{8}=+4.10^{-5}$	$+\frac{510}{8}=+64.10^{-5}$

		Lotabweichung	X (D − K)	(−Y) (D − K)	Z (D − K)

I

	Wernerode	+6,3	~~−0,00 071~~		
22	Heudeber		−0,00 071	+0,00 033	−0,00 120
27	Halberstadt		+0,00 001	+0,00 011	+0,00 013
			$-\frac{70}{2} = -35.10^{-5}$	$+\frac{44}{2} = +22.10^{-5}$	$-\frac{107}{2} = -54.10^{-5}$

II

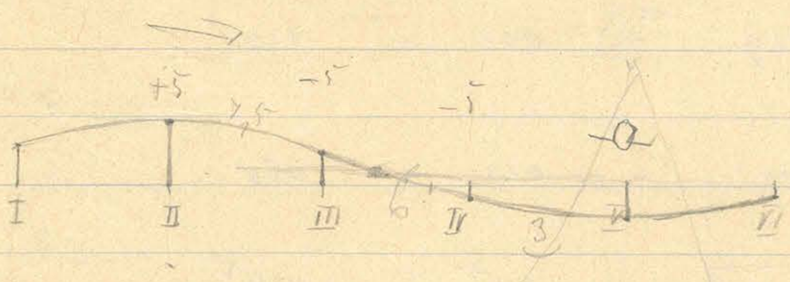
2	Langelsheim	+7,6	−0,00 018	−0,00 044	−0,00 025
10	Harzburg	+12,7	+ 009	− 008	+ 129
11	Winterberg	+12,0	− 046	+ 034	− 053
12	Kattenäse	+13,4	− 076	− 031	− 139
16	Ilsenburg	+10,0	+ 035	+ 033	+ 013
17	Wernigerode		− 019	+ 052	− 041
	Horstberg	+10,6			
	Ziegenkopf	+7,8			
	Regenstein	+5,2			
28	Blankenburg	+8,6	− ~~8~~ 036	+ 021	− 001
	Michaelstein	+9,5			
29	Quedlinburg	+8,1	− 002	− 010	+ 182
30	Neinstadt	+7,4	+ 009	− 002	+ 020
	Gegensteine	+8,1			
37	Aschersleben	+2,5	+ 005	− 022	+ 060
	Lohberg	+5,0			
		$\frac{128,5}{15} = +8,57$	$-\frac{109}{10} = -11.10^{-5}$	$-\frac{23}{10} = -2.10^{-5}$	$+\frac{145}{10} = +15.10^{-5}$

VI

	Löwenberg	−1,1			
15	Bleicherode		−0,00 005	+0,00 037	−0,00 005
35	Rothenberg	−1,6	− 084	+ 100	+ 140
		$-\frac{2,7}{2} = -1,35$	$-\frac{89}{2} = -45.10^{-5}$	$+\frac{137}{2} = +69\,10^{-5}$	$+\frac{135}{2} = +68\,10^{-5}$

		Lotabweichung	X D-K V	Y D-K	Z D-K
	Wulften	−2,2	~~+0,00 05~~		
7	Herzberg	−3,0	+0,00 085	−0,00 042	+0,00 342
14	Tettenborn	−6,0	0,00 000	+ 026	− 037
20	Ellrich		+ 097	+ 029	+ 273
25	Ilfeld		+ 129	− 053	+ 398
26	Nordhausen	−4,9	− 028	− 003	+ 033
33	Stollberg		+ 006	+ 002	+ 302
	Kirchberg	−5,9			
34	Rossla		− 010	− 022	+ 259
40	Sangerhausen		− 053	+ 001	+ 214
41	Bornstedt	−5,1	− 064	− 022	+ 035
		$-\frac{27,1}{6} = -4,52$	$+\frac{162}{9} = +18.10^{-5}$	$-\frac{84}{9} = -9.10^{-5}$	$+\frac{1819}{9} = +202.10^{-5}$

$-\frac{8,6}{100}$



−70 +360 -410.10^{-5} 349

$\Delta X = 0,2 \cdot 450 = K\, d\, 2 \; \frac{8,6}{200} \cdot \frac{15.m}{2.m}$

$\frac{45 \cdot 400\, m}{10\,000 \cdot 90\, m} = \frac{18000}{900000}$

$\frac{K}{\sigma} = 0,020$

a, b, c egy elemnek pontnak középponti összetevői

$$a = l \sin \Phi$$
$$b = l \cos \Phi \sin \Lambda$$
$$c = -l \cos \Phi \cos \Lambda$$

$$\xi = c \sin\varphi \cos\lambda - b \sin\varphi \sin\lambda + a \cos\varphi$$

$$\eta = b \cos\lambda + c \sin\lambda$$

$$\zeta = r + c \cos\lambda \cos\varphi - b \sin\lambda \cos\varphi - a \sin\varphi$$

$$\rho^2 = r^2 + a^2 + b^2 + c^2 + 2rc \cos\lambda \cos\varphi - 2rb \sin\lambda \cos\varphi - 2ra \sin\varphi$$

$$N = a^2 + b^2 + c^2 + 2rc \cos\lambda \cos\varphi - 2rb \sin\lambda \cos\varphi - 2ra \sin\varphi .$$

$$\rho^2 = r^2 + N$$

$$\frac{1}{\rho^3} = \frac{1}{r^3} - \frac{3}{2} \frac{N}{r^5} + \frac{15}{8} \frac{N^2}{r^7} - \cdots$$

$$\frac{1}{\rho^5} = \frac{1}{r^5} - \frac{5}{2} \frac{N}{r^7} + \frac{35}{8} \frac{N^2}{r^9} + \cdots$$

legyen dV térfogati elem $\int dV = V$

a tömegközéppont összetevői a_0 b_0 c_0 egy elem összetevői a középponti koordinátarendszerben $a = a_0 + a'$ $b = b_0 + b'$, $c = c_0 + c'$

elhanyagoljuk a^2 és $b^2 + c^2$ 1-nél magasabb hatványait és a_0 b_0 c_0-nak egynél magasabb hatványait, akkor tehát

$\int dV a^2$ helyébe $\int dV a'^2$-et és így tovább lesz:

$\int ab\, dV$ helyébe

$$\frac{\partial^2 U}{\partial x^2} = -\frac{V}{r^3} + 3\frac{V}{r^4}\left(-a_0 \sin\varphi - b_0 \sin\lambda \cos\varphi + c_0 \cos\lambda \cos\varphi\right) +$$

$$+ \frac{1}{r^5}\int a'^2 dV \left(\frac{3}{2} - \frac{15}{2}\sin^2\varphi + 3\cos^2\varphi\right) + \frac{1}{r^5}\int b'^2 dV\left(\frac{3}{2} - \frac{15}{2}\sin^2\lambda \cos^2\varphi + 3\sin^2\lambda \sin^2\varphi\right) + \frac{1}{r^5}\int c'^2 dV \left(\frac{3}{2} - \frac{15}{2}\cos^2\lambda\cos^2\varphi + 3\cos^2\lambda \sin^2\varphi\right)$$

$$-\frac{1}{r^5}\int a'b' dV \cdot \frac{21}{2}\sin\lambda \sin 2\varphi + \frac{1}{r^5}\int b'c' dV\left(\frac{21}{2}\sin 2\lambda \cos^2\varphi - 3\sin 2\lambda\right) + \frac{1}{r^5}\int c'a' dV \frac{21}{2}\cos\lambda \sin 2\varphi$$

$$\frac{\partial^2 U}{\partial y^2} = -\frac{V}{r^3} + 3\frac{V}{r^4}\left(-a_0 \sin\varphi - b_0 \sin\lambda \cos\varphi + c_0 \cos\lambda \cos\varphi\right) +$$

$$+ \frac{1}{r^5}\int a'^2 dV\left(\frac{3}{2} - \frac{15}{2}\sin^2\varphi\right) + \frac{1}{r^5}\int b'^2 dV \left(\frac{3}{2} - \frac{15}{2}\sin^2\lambda \cos^2\varphi + 3\cos^2\lambda\right) + \frac{1}{r^5}\int c'^2 dV\left(\frac{3}{2} - \frac{15}{2}\cos^2\lambda \cos^2\varphi + 3\sin^2\lambda\right)$$

$$-\frac{1}{r^5}\int a'b' dV \frac{15}{2}\sin\lambda \sin 2\varphi + \frac{1}{r^5}\int b'c' dV\left(\frac{15}{2}\sin 2\lambda \cos^2\varphi + 3\sin 2\lambda\right) + \frac{1}{r^5}\int c'a' dV \frac{15}{2}\cos\lambda \sin 2\varphi$$

$$\frac{\partial^2 U}{\partial z^2} = +2\frac{V}{r^3} - 6\frac{V}{r^4}(-a_0 \sin\varphi - b_0 \sin\lambda\cos\varphi + c_0 \cos\lambda\cos\varphi)$$

$$-\frac{1}{r^5}\int a'^2 dV(6 - 18\sin^2\varphi) - \frac{1}{r^5}\int b'^2 dV(6 - 18\sin^2\lambda\cos^2\varphi) - \frac{1}{r^5}\int c'^2 dV(6 - 18\cos^2\lambda\cos^2\varphi)$$

$$+\frac{1}{r^5}\int a'b'dV\ 18\sin\lambda\sin 2\varphi - \frac{1}{r^5}\int b'c'dV . 18\sin 2\lambda\cos^2\varphi - \frac{1}{r^5}\int a'c'dV . 18\cos\lambda\sin 2\varphi$$

$$\frac{\partial^2 U}{\partial x\partial y} = -\frac{3}{2}\frac{1}{r^5}\sin 2\lambda\sin\varphi\int b'^2 dV + \frac{3}{2}\frac{1}{r^5}\sin 2\lambda\sin\varphi\int c'^2 dV$$

$$+3\frac{1}{r^5}\cos\lambda\cos\varphi\int a'b'dV + 3\frac{1}{r^5}\cos 2\lambda\sin\varphi\int b'c'dV + 3\frac{1}{r^5}\sin\lambda\cos\varphi\int a'c'dV$$

$$\frac{\partial^2 U}{\partial x\partial z} = +\frac{3V}{r^4}(a_0\cos\varphi - b_0\sin\lambda\sin\varphi + c_0\cos\lambda\sin\varphi) +$$

$$+\frac{6}{r^5}\sin 2\varphi\int a'^2 dV - \frac{6}{r^5}\sin^2\lambda\sin 2\varphi\int b'^2 dV - \frac{6}{r^5}\cos^2\lambda\sin 2\varphi\int c'^2 dV$$

$$+\frac{12}{r^5}\sin\lambda\cos 2\varphi\int a'b'dV + \frac{6}{r^5}\sin 2\lambda\sin 2\varphi\int b'c'dV - \frac{12}{r^5}\cos\lambda\cos 2\varphi\int c'a'dV.$$

$$\frac{\partial^2 U}{\partial y\partial z} = +\frac{3V}{r^4}(b_0\cos\lambda + c_0\sin\lambda) +$$

$$+\frac{6}{r^5}\sin 2\lambda\cos\varphi\int b'^2 dV - \frac{6}{r^5}\sin 2\lambda\cos\varphi\int c'^2 dV$$

$$+\frac{12}{r^5}\cos\lambda\sin\varphi\int a'b'dV - \frac{12}{r^5}\cos 2\lambda\cos\varphi\int b'c'dV + \frac{12}{r^5}\sin\lambda\sin\varphi\int a'c'dV$$

régi (1908 előtti)

$$\xi = -l\sin\varphi\cos\varphi_0\cos(\lambda_0-\lambda) + l\sin\varphi_0\cos\varphi$$

$$\eta = l\cos\varphi_0\sin(\lambda_0-\lambda).$$

$$\zeta = r - (l\cos\varphi_0\cos(\lambda_0-\lambda)\cos\varphi + l\sin\varphi_0\sin\varphi)$$

$$\mu_x = -\mu\sin\varphi\cos\varphi_\tau\cos(\lambda_\tau-\lambda) + \mu\sin\varphi_\tau\cos\varphi.$$

$$\mu_y = \mu\cos\varphi_\tau\sin(\lambda_\tau-\lambda)$$

$$\mu_z = -(\mu\cos\varphi_\tau\cos(\lambda_\tau-\lambda)\cos\varphi + \mu\sin\varphi_\tau\sin\varphi)$$

Képezetünk

$$\frac{\partial^2 U}{\partial x^2} = -\frac{1}{\rho^3} + 3\frac{\xi^2}{\rho^5}$$

$$\frac{\partial^2 U}{\partial x\partial y} = 3\frac{\xi\eta}{\rho^5}$$

$$\frac{\partial^2 U}{\partial x\partial z} = 3\frac{\xi\zeta}{\rho^5}$$

$$\frac{\partial^2 U}{\partial y^2} = -\frac{1}{\rho^3} + 3\frac{\eta^2}{\rho^5}$$

$$\frac{\partial^2 U}{\partial y\partial z} = 3\frac{\eta\zeta}{\rho^5}$$

$$\frac{\partial^2 U}{\partial z^2} = -\frac{1}{\rho^3} + 3\frac{\zeta^2}{\rho^5} \qquad \cancel{\text{ahol } \rho^2 = r^2 + l^2 - 2rl(\cos\varphi_0}$$

ahol $\rho^2 = r^2 + l^2 - 2rl(\cos\varphi_0\cos(\lambda_0-\lambda)\cos\varphi + \sin\varphi_0\sin\varphi) = \xi^2 + \eta^2 + \zeta^2$

$\frac{l^2}{r^2}$ rendű tagok elhanyagolásával :

$$\frac{\partial^2 U}{\partial x^2} = -\frac{1}{r^3} - \frac{3rl}{r^5}(\cos\varphi_0\cos(\lambda_0-\lambda)\cos\varphi + \sin\varphi_0\sin\varphi)$$

$$\frac{\partial^2 U}{\partial x\partial y} = 0$$

$$\frac{\partial^2 U}{\partial x\partial z} = \frac{3rl}{r^5}(-\sin\varphi\cos\varphi_0\cos(\lambda_0-\lambda) + \sin\varphi_0\cos\varphi)$$

$$\frac{\partial^2 U}{\partial y^2} = -\frac{1}{r^3} - \frac{3rl}{r^5}(\cos\varphi_0\cos(\lambda_0-\lambda)\cos\varphi + \sin\varphi_0\sin\varphi)$$

$$\frac{\partial^2 U}{\partial y\partial z} = \frac{3rl}{r^5}.\cos\varphi_0\sin(\lambda_0-\lambda)$$

$$\frac{\partial^2 U}{\partial z^2} = +\frac{2}{r^3} + \frac{6rl}{r^5}(\cos\varphi_0\cos(\lambda_0-\lambda)\cos\varphi + \sin\varphi_0\sin\varphi)$$

$$X = \mu_x\frac{\partial^2 U}{\partial x^2} + \mu_y\frac{\partial^2 U}{\partial x\partial y} + \mu_z\frac{\partial^2 U}{\partial x\partial z} \qquad Y = \mu_x\frac{\partial^2 U}{\partial x\partial y} + \mu_y\frac{\partial^2 U}{\partial y^2} + \mu_z\frac{\partial^2 U}{\partial y\partial z} \qquad Z = \mu_x\frac{\partial^2 U}{\partial x\partial z} + \mu_y\frac{\partial^2 U}{\partial y\partial z} + \mu_z\frac{\partial^2 U}{\partial z^2}$$

$$X = -\frac{\mu}{r^3}\left(\sin\varphi_\tau\cos\varphi - \cos\varphi_\tau\cos(\lambda_\tau-\lambda)\sin\varphi\right) + \frac{3\mu l}{r^4}\Big\{\cos\varphi_0\cos\varphi_\tau\cos(\lambda_0-\lambda)\cos(\lambda_\tau-\lambda)\sin 2\varphi -$$

$$- \sin\varphi_0\sin\varphi_\tau\sin 2\varphi - \sin\varphi_0\cos\varphi_\tau\cos(\lambda_\tau-\lambda)\cos 2\varphi - \cos\varphi_0\sin\varphi_\tau\cos(\lambda_0-\lambda)\cos 2\varphi\Big\}$$

$$Y = -\frac{\mu}{r^3}\cos\varphi_\tau\sin(\lambda_\tau-\lambda) - 3\frac{\mu l}{r^4}\Big\{\sin\varphi_0\cos\varphi_\tau\sin(\lambda_\tau-\lambda)\sin\varphi + \cos\varphi_0\sin\varphi_\tau\sin(\lambda_0-\lambda)\sin\varphi$$

$$+\cos\varphi_0\cos\varphi_\tau\sin(\lambda_0+\lambda_\tau-2\lambda)\cdot\cos\varphi\Big\}$$

$$Z = -\frac{2\mu}{r^3}\left(\cos\varphi_\tau\cos(\lambda_\tau-\lambda)\cos\varphi + \sin\varphi_\tau\sin\varphi\right) + \frac{3\mu l}{r^4}\Big\{\cos\varphi_0\cos\varphi_\tau\cos(\lambda_0-\lambda_\tau) - 2\sin\varphi_0\sin\varphi_\tau$$

$$+3\left(\sin\varphi_0\sin\varphi_\tau - \cos\varphi_0\cos\varphi_\tau\cos(\lambda_0-\lambda)\cos(\lambda_\tau-\lambda)\right)\cos^2\varphi - \frac{3}{2}\left(\sin\varphi_0\cos\varphi_\tau\cos(\lambda_\tau-\lambda) + \cos\varphi_0\sin\varphi_\tau\cos(\lambda_0-\lambda)\right)\sin 2\varphi\Big\}$$

сделаем теперь

$$\cos(\lambda_\tau-\lambda) = \cos\lambda_\tau\cos\lambda + \sin\lambda_\tau\sin\lambda$$

$$\cos(\lambda_0-\lambda) = \cos\lambda_0\cos\lambda + \sin\lambda_0\sin\lambda$$

$$\cos(\lambda_\tau-\lambda)\cos(\lambda_0-\lambda) = \cos\lambda_0\cos\lambda_\tau\cos^2\lambda + \sin\lambda_\tau\sin\lambda_0\sin^2\lambda + \sin(\lambda_\tau+\lambda_0)\sin\lambda\cos\lambda$$

$$X = \Big\{-\frac{\mu}{r^3}\sin\varphi_\tau\cos\varphi - 3\frac{\mu l}{r^4}\sin\varphi_0\sin\varphi_\tau\sin 2\varphi\Big\}$$

$$+\Big\{\frac{\mu}{r^3}\cos\varphi_\tau\cos\lambda_\tau\sin\varphi - 3\frac{\mu l}{r^4}\sin\varphi_0\cos\varphi_\tau\cos\lambda_\tau\cos 2\varphi - \frac{3\mu l}{r^4}\cos\varphi_0\sin\varphi_\tau\cos\lambda_0\cos 2\varphi\Big\}\cos\lambda$$

$$+\Big\{\frac{\mu}{r^3}\cos\varphi_\tau\sin\lambda_\tau\sin\varphi - 3\frac{\mu l}{r^4}\sin\varphi_0\cos\varphi_\tau\sin\lambda_\tau\cos 2\varphi - \frac{3\mu l}{r^4}\cos\varphi_0\sin\varphi_\tau\sin\lambda_0\cos 2\varphi\Big\}\sin\lambda$$

$$+\frac{3\mu l}{r^4}\cos\varphi_0\cos\varphi_\tau\cos\lambda_0\cos\lambda_\tau\sin 2\varphi\cdot\cos^2\lambda$$

$$+\frac{3\mu l}{r^4}\cos\varphi_0\cos\varphi_\tau\sin\lambda_0\sin\lambda_\tau\sin 2\varphi\cdot\sin^2\lambda$$

$$+\frac{3\mu l}{r^4}\cos\varphi_0\cos\varphi_\tau\sin(\lambda_0+\lambda_\tau)\sin 2\varphi\sin\lambda\cos\lambda$$

$$Y = \Big\{\frac{\mu}{r^3}\cos\varphi_\tau\cos\lambda_\tau + 3\frac{\mu l}{r^4}\sin\varphi_0\cos\varphi_\tau\cos\lambda_\tau\sin\varphi + 3\frac{\mu l}{r^4}\cos\varphi_0\sin\varphi_\tau\cos\lambda_0\sin\varphi\Big\}\sin\lambda$$

$$-\Big\{\frac{\mu}{r^3}\cos\varphi_\tau\sin\lambda_\tau + 3\frac{\mu l}{r^4}\sin\varphi_0\cos\varphi_\tau\sin\lambda_\tau\sin\varphi + 3\frac{\mu l}{r^4}\cos\varphi_0\sin\varphi_\tau\sin\lambda_0\sin\varphi\Big\}\cos\lambda$$

$$+\cos\varphi_0\cos\varphi_\tau\cos(\lambda_0+\lambda_\tau)\cos\varphi\sin 2\lambda\cdot\frac{3\mu l}{r^4}$$

$$-\cos\varphi_0\cos\varphi_\tau\sin(\lambda_0+\lambda_\tau)\cos\varphi\cos 2\lambda\cdot\frac{3\mu l}{r^4}$$

$$Z = \left\{ -\frac{2\mu}{r^3}\sin\varphi_\tau \sin\varphi - 6\frac{\mu l}{r^4}\sin\varphi_0 \sin\varphi_\tau + 9\frac{\mu l}{r^4}\sin\varphi_0 \sin\varphi_\tau \cos^2\varphi + 3\frac{\mu l}{r^4}\cos\varphi_0\cos\varphi_\tau\cos(\lambda_0-\lambda_\tau)\right\}$$

$$+ \left\{ -\frac{2\mu}{r^3}\cos\varphi_\tau \sin\lambda_\tau \cos\varphi - \left(\frac{9}{2}\frac{\mu l}{r^4}\sin\varphi_0\cos\varphi_\tau\sin\lambda_\tau + \frac{9}{2}\frac{\mu l}{r^4}\cos\varphi_0\sin\varphi_\tau\sin\lambda_0\right)\sin 2\varphi \right\}\sin\lambda$$

$$+ \left\{ -\frac{2\mu}{r^3}\cos\varphi_\tau \cos\lambda_\tau \cos\varphi - \left(\frac{9}{2}\frac{\mu l}{r^4}\sin\varphi_0\cos\varphi_\tau\cos\lambda_\tau + \frac{9}{2}\frac{\mu l}{r^4}\cos\varphi_0\sin\varphi_\tau\cos\lambda_0\right)\sin 2\varphi \right\}\cos\lambda$$

$$\mp 9\frac{\mu l}{r^4}\cos\varphi_0\cos\varphi_\tau\cos\lambda_0\cos\lambda_\tau\cos^2\varphi \cdot \cos^2\lambda$$

$$\mp 9\frac{\mu l}{r^4}\cos\varphi_0\cos\varphi_\tau\sin\lambda_0\sin\lambda_\tau\cos^2\varphi \cdot \sin^2\lambda$$

$$\mp 9\frac{\mu l}{r^4}\cos\varphi_0\cos\varphi_\tau\sin(\lambda_0+\lambda_\tau)\cos^2\varphi\sin\lambda\cos\lambda$$

ahol z a következő 4-ed fokú egyenletből határozandó meg

$$XYV - U(X^2 - Y^2) = 0. \tag{1}$$

Tehát először megoldandó (1), s azután x és y-t a

$$y = \frac{U}{X} \qquad x = \frac{U}{Y} \tag{2}$$

egyenletek adják meg.

Kürschaktól.

Megoldandó:

$$(A_1+B_1z)x+(C_1+D_1z)y+E_1xy+F_1(x^2-y^2)=0$$
$$(A_2+B_2z)x+ \quad \ldots \quad =0$$
$$(A_3+B_3z)x+ \quad \ldots \quad =0.$$

Innen

$$x:y:xy:(x^2-y^2)=X:Y:U:V,$$

hol

$$X=\begin{vmatrix} C_1+D_1z & E_1 & F_1 \\ C_2+D_2z & E_2 & F_2 \\ C_3+D_3z & E_3 & F_3 \end{vmatrix} \qquad Y=-\begin{vmatrix} A_1+B_1z & E_1 & F_1 \\ A_2+B_2z & E_2 & F_2 \\ A_3+B_3z & E_3 & F_3 \end{vmatrix}$$

$$U=\begin{vmatrix} A_1+B_1z & C_1+D_1z & F_1 \\ A_2+B_2z & C_2+D_2z & F_2 \\ A_3+B_3z & C_3+D_3z & F_3 \end{vmatrix}$$

$$V=-\begin{vmatrix} A_1+B_1z & C_1+D_1z & E_1 \\ A_2+B_2z & C_2+D_2z & E_2 \\ A_3+B_3z & C_3+D_3z & E_3 \end{vmatrix}$$

y	$1+(5+y)^2$	$1+(5-y)^2$	N	$20y$	$260-10y^2$	I	II
4,1	83,81	1,81	151,6961	82	91,9	+0,5405	+0,6058
4,2	85,64	1,64	140,45	84	83,6	0,5981	+0,5952
4,3	87,49	1,49	130,36	86	75,1	0,6596	+0,5761
4,4	89,36	1,36	121,53	88	66,4	0,7241	+0,5464
4,5	91,25	1,25	114,06	90	57,5	0,7891	+0,5041
4,6	93,16	1,16	108,06	92	48,4	0,8514	+0,4478
4,7	95,09	1,09	103,65	94	39,1	0,9068	+0,3772
4,8	97,04	1,04	100,92	96	29,6	0,9512	+0,2934
4,9	99,01	1,01	100,00	98	19,9	0,9800	+0,1990
3,5	73,25	3,25	238,06	70	137,5	+0,2941	+0,5775
3,6	74,96	2,96	221,88	72	130,4	+0,3244	+0,5876
3,7	76,69	2,69	206,28	74	123,1	+0,3587	+0,5967
3,8	78,44	2,44	191,39	76	115,6	+0,3971	+0,6040
3,9	80,21	2,21	177,26	78	107,9	+0,4400	+0,6087
5,5	111,25	1,25	139,06	110	−42,5	+0,7910	−0,3056
5,6	113,36	1,36	154,17	112	−53,6	+0,7265	−0,3477
5,7	115,49	1,49	172,08	114	−64,9	+0,6625	−0,3772
5,8	117,64	1,64	192,93	116	−76,4	+0,6013	−0,3959
5,9	119,81	1,81	216,86	118	−88,1	+0,5441	−0,4063
6,1	124,21	2,21	274,51	122	−112,1	+0,4444	−0,4084
6,2	126,44	2,44	308,57	124	−124,4	+0,4019	−0,4032
6,3	128,69	2,69	346,18	126	−136,9	+0,3639	−0,3955
6,4	130,96	2,96	387,64	128	−149,6	+0,3302	−0,3859
6,5	133,25	3,25	433,06	130	−162,5	+0,3002	−0,3752
5,1	103,01	1,01	104,04	102	−0,1	+0,9804	−0,0096
5,2	105,04	1,04	109,24	104	−10,4	+0,9520	−0,0952
5,3	107,09	1,09	116,73	106	−20,9	+0,9081	−0,1790
5,4	109,16	1,16	126,63	108	−31,6	+0,8528	−0,2495

2)

$$Y = \beta \frac{\partial \psi}{\partial y} + \gamma \frac{\partial \psi}{\partial z}$$

$$Z = \beta \frac{\partial \psi}{\partial z} - \gamma \frac{\partial \psi}{\partial y}$$

$$\gamma Y + \beta Z = (\beta^2+\gamma^2)\frac{\partial \psi}{\partial z}$$

$$-\beta Y - \gamma Z = (\beta^2+\gamma^2)\frac{d\psi}{dy}$$

3)
$$\begin{cases} \dfrac{d\psi}{dz} = \dfrac{\gamma Y + \beta Z}{\beta^2+\gamma^2} = \dfrac{1}{\gamma}\dfrac{Y + \frac{\beta}{\gamma} Z}{1+\frac{\beta^2}{\gamma^2}} \\[2ex] -\dfrac{d\psi}{dy} = \dfrac{\gamma Z - \beta Y}{\gamma^2+\beta^2} = \dfrac{1}{\gamma}\dfrac{Z - \frac{\beta}{\gamma} Y}{1+\frac{\beta^2}{\gamma^2}} \end{cases}$$

[illegible]

$$\frac{d\psi'}{\partial z} = f\frac{\partial\psi}{\partial z} = \frac{f}{kV}\frac{1}{1+\frac{u^2}{v^2}\sin^2\vartheta}\left(Y_1\, 2qk\, u\sin\vartheta + \frac{u}{v}\sin\vartheta\, 2qk\, u\sin\vartheta\, Z_1\right)$$

$$-\frac{\partial\psi'}{\partial y} = f\frac{\partial\psi}{\partial y} = \frac{f}{kV}\frac{1}{1+\frac{u^2}{v^2}\sin^2\vartheta}\left(Z_1\, 2qk\, u\sin\vartheta - \frac{u\sin\vartheta}{V}\, 2qk\, u\sin\vartheta\, Y_1\right)$$

$\cancel{\frac{d\psi}{dz}\ \frac{u\sin\vartheta}{1+\frac{u^2}{v^2}}}$ [illegible]

$$\frac{\partial\psi'}{\partial z} = 2qf\frac{u\sin\vartheta}{V}\frac{1}{1+\frac{u^2}{v^2}\sin^2\vartheta}\left(Y_1 + Z_1\frac{u}{v}\sin\vartheta\right)$$

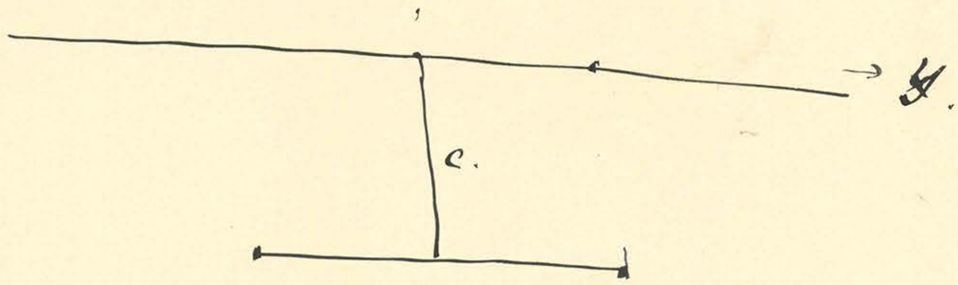
$$-\frac{\partial\psi'}{\partial y} = 2qf\frac{u\sin\vartheta}{V}\frac{1}{1+\frac{u^2}{v^2}\sin^2\vartheta}\left(Z_1 - Y_1\frac{u}{v}\sin\vartheta\right)$$

példánkban $\frac{u}{v}\sin\vartheta = \frac{1}{10}$ tehát

$$\frac{\partial\psi'}{\partial z} = 2qf\frac{1}{10}\frac{1}{1{,}01}\left(Y_1 + \frac{1}{10}Z_1\right) \qquad \left(\frac{\partial\psi'}{\partial z}\right)_1 = \frac{\frac{\partial\psi'}{\partial z}}{2qf\frac{1}{10}}$$

$$-\frac{\partial\psi'}{\partial y} = 2qf\frac{1}{10}\frac{1}{1{,}01}\left(Z_1 - \frac{1}{10}Y_1\right) \qquad \left(\frac{\partial\psi'}{\partial y}\right)_1 = \frac{\frac{\partial\psi'}{\partial y}}{2qf\frac{1}{10}}$$

c mélységben 2l szélességű szalag.



$$\frac{\partial Y}{\partial y} = -kfh\left\{\frac{(y+l)}{c^2+(y+l)^2} - \frac{y-l}{c^2+(y-l)^2}\right\}$$

$$\frac{\partial Y}{\partial z} = kfh\left\{\frac{c}{c^2+(y+l)^2} - \frac{c}{c^2+(y-l)^2}\right\}$$

$\cancel{\frac{\partial Y}{\partial y} = -kfh \frac{}{(c^2+(y+l)^2)(c^2+(y-l)^2)}}$ ha $c = l = 1$ [illegible]

$$\frac{\partial Y}{\partial z} = -kfh\frac{4y}{(1+(1+y)^2)(1+(1-y)^2)} \qquad \frac{\partial Y}{\partial z}\frac{1}{kfh} = I$$

$$\frac{\partial Y}{\partial y} = -kfh\frac{4-2y^2}{(1+(1+y)^2)(1+(1-y)^2)} \qquad \frac{\partial Y}{\partial y}\frac{1}{kfh} = II$$

ha $c = 1$

$$\frac{\partial Y}{\partial y} = -kfh\frac{2l+2l^3-2ly^2}{[1+(y+l)^2][1+(y-l)^2]}$$

$$\frac{\partial Y}{\partial z} = -kfh\frac{4yl}{[\qquad]}$$

$l = 5$

$$\frac{\partial Y}{\partial y} = -kfh\frac{260-10y^2}{(1+(5+y)^2)(1+(5-y)^2)}$$

$$\frac{\partial Y}{\partial z} = -kfh\frac{20y}{(1+(5+y)^2)(1+(5-y)^2)}$$

y	$1+(5+y)^2$	$1+(5-y)^2$	N	$20y$	$260-10y^2$	I	II
1	+37	+17	629	20	+250	+0,03179	+0,3975
2	+50	+10	500	40	+220	+0,08000	+0,4400
3	+65	+5	325	60	+170	+0,1846	+0,5231
4	+82	+2	164	80	+100	+0,4878	+0,6097
5	+101	+1	101	100	+10	+0,9901	+0,0990
6	+122	+2	244	120	−100	+0,4918	−0,4098
7	+145	+5	725	140	−230	+0,1931	−0,3172
8	+170	+10	1700	160	−380	+0,0941	−0,2235
9	+197	+17	3349	180	−550	+0,0538	−0,1642
10	+226	+26	5876	200	−740	+0,0340	−0,1259
11	+257	+37	9509	220	−950	+0,0231	−0,0999
12	+290	+50	14500	240	−1180	+0,0166	−0,0814
13	+325	+65	21125	260	−1430	+0,0124	−0,0677
14	+362	+82	29684	280	−1700	+0,0094	−0,0573
15	+401	+101	40501	300	−1990	+0,0074	−0,0491
16	+442	+122	53924	320	−2300	+0,0059	−0,0427
17	+485	+145	70325	340	−2630	+0,0048	−0,0374
18	+530	+170	90100	360	−2980	+0,0040	−0,0330
19	+577	+197	113669	380	−3350	+0,0033	−0,0295
20	+626	+226	141476	400	−3740	+0,0028	−0,0264
~~4,1~~							
4,21							
4,							
0	26	26	676	0	260	0	0,3846

y	$1+(1+y)^2$	$1+(1-y)^2$	N	$4y$	$4-2y^2$	I	II
0	2,00	2,00	4,0000	+ 0	+4,00	+ 0,0000	+ 1,0000
0,1	2,21	1,81	4,0001	+ 0,4	+3,98	+ 0,1000	+ 0,9949
0,2	2,44	1,64	4,0016	+0,8	+3,92	+ 0,1999	+ 0,9796
0,3	2,69	1,49	4,0081	+1,2	+3,82	+ 0,2994	+ 0,9531
0,4	2,96	1,36	4,0256	+1,6	+3,68	+ 0,3975	+ 0,9142
0,5	3,25	1,25	4,0625	+2,0	+3,50	+ 0,4923	+ 0,8615
0,6	3,56	1,16	4,1296	+2,4	+3,28	+ 0,5812	+ 0,7943
0,7	3,89	1,09	4,2401	+2,8	+3,02	+ 0,6604	+ 0,7122
0,8	4,24	1,04	4,4096	+3,2	+2,72	+ 0,7257	+ 0,6168
0,9	4,61	1,01	4,6561	+3,6	+2,38	+ 0,7732	+ 0,5112
1,0	5,00	1,00	5,0000	+4,0	+2,00	+ 0,8000	+ 0,4000
1,1	5,41	1,01	5,4641	+4,4	+1,58	+ 0,8053	+ 0,2982
1,2	5,84	1,04	6,0736	+4,8	+1,12	+ 0,7903	+ 0,1844
1,3	6,29	1,09	6,8560	+5,2	+0,62	+ 0,7585	+ 0,0904
1,4	6,76	1,16	7,8416	+5,6	+0,08	+ 0,7141	+ 0,0102
1,5	7,25	1,25	9,0625	+6,0	−0,50	+ 0,6621	− 0,0552
1,6	7,76	1,36	10,5536	+6,4	−1,12	+ 0,6064	− 0,1061
1,7	8,29	1,49	12,3521	+6,8	−1,78	+ 0,5505	− 0,1441
1,8	8,84	1,64	14,4976	+7,2	−2,48	+ 0,4966	− 0,1711
1,9	9,41	1,81	17,0321	+7,6	−3,22	+ 0,4462	− 0,1891
2,0	10,00	2,00	20,0000	+8,0	−4,00	+ 0,4000	− 0,2000
2,1	10,61	2,21	23,4481	+8,4	−4,82	+ 0,3582	− 0,2056
2,2	11,24	2,44	27,4256	+8,8	−5,68	+ 0,3209	− 0,2071
2,3	11,89	2,69	31,9841	+9,2	−6,58	+ 0,2876	− 0,2057
2,4	12,56	2,96	37,1776	+9,6	−7,52	+ 0,2582	− 0,2023
2,5	13,25	3,25	43,0625	+10,0	−8,50	+ 0,2322	− 0,1974
2,6	13,96	3,56	49,6976	+10,4	−9,52	+ 0,2093	− 0,1916
2,7	14,69	3,89	57,1441	+ 10,8	−10,58	+ 0,1889	− 0,1851
2,8	15,44	4,24	65,4656	+ 11,2	−11,68	+ 0,1711	− 0,1784

y	$1+(1+y)^2$	$1+(1-y)^2$	N	$4y$	$4-2y^2$	I	II
2,9	16,21	4,61	74,7281	+11,6	-12,82	+0,1552	-0,1715
3,0	17,0	5,0	85,000	+12,0	-14,0	+0,1412	-0,1647
4,0	26,0	10,0	260,000	+16,0	-28,0	+0,0615	-0,1077
5,0	37,0	17,0	629,000	+20,0	-46,0	+0,0318	-0,0731
6,0	50,0	26,0	1300,000	+24,0	-68,0	+0,0185	-0,0523
7,0	65,0	37,0	2405,000	+28,0	-94,0	+0,0116	-0,0391
8,0	82,0	50,0	4100,000	+32,0	-124,0	+0,0078	-0,0302
9,0	101,0	65,0	6565,000	+36,0	-158,0	+0,0055	-0,0241
10,0	122,0	82,0	10004,000	+40,0	-196,0	+0,0040	-0,0196

$\frac{7}{2}$ + 3

$1+(5+7)^2$ | $1+(5-7)^2$ | $20\,7$ | $260-10\,7^2$

$1+(5+2)^2$

= 50

10

90

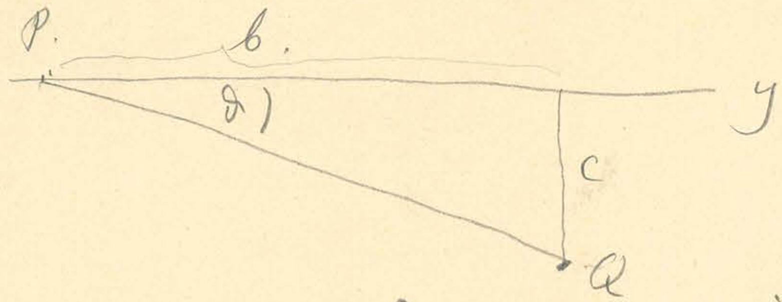
102 · 102 ·

1002 ·

20 · 20 = 400

− 260

260,7
270,4
280,9
291,6



A ban a rajz síkjára a irányban végtelen rúd.

$$Y = 2q\frac{b-y}{(b-y)^2+(c-z)^2} \qquad \frac{\partial Y}{\partial y} = 2q\frac{(b-y)^2\,2}{\left((b-y)^2+(c-z)^2\right)^2} - 2q\frac{1}{(b-y)^2+(c-z)^2}$$

$$\frac{\partial Y}{\partial y} = 2q\frac{b^2-c^2}{(b^2+c^2)^2}$$

$$\frac{\partial Z}{\partial z} = -\frac{\partial Y}{\partial y} = 2q\frac{c^2-b^2}{(b^2+c^2)^2}$$

$$\frac{\partial Y}{\partial z} = \frac{\partial Z}{\partial y} = 2q\frac{(b-y)(c-z)\,2}{\left((b-y)^2+(c-z)^2\right)^2} = 2q\frac{2bc}{(b^2+c^2)^2}$$

Ingyenes erő

$$X = 0$$
$$Y = \beta\frac{dY}{dy} + \gamma\frac{\partial Y}{\partial z}$$
$$Z = \beta\frac{\partial Y}{\partial z} + \gamma\frac{\partial Z}{\partial z}.$$

$$1)\left\{\begin{aligned} &X = 0\\ &\frac{Y}{2q} = \beta\frac{b^2-c^2}{(b^2+c^2)^2} + \gamma\frac{2bc}{(b^2+c^2)^2}\\ &\frac{Z}{2q} = \beta\frac{2bc}{(b^2+c^2)^2} + \gamma\frac{c^2-b^2}{(b^2+c^2)^2}\end{aligned}\right.$$

$$1'\left\{\begin{aligned} &X_1 = 0\\ &Y_1 = \frac{Y}{2q\beta} = \frac{b^2-c^2}{(b^2+c^2)^2} + \frac{\gamma}{\beta}\frac{2bc}{(b^2+c^2)^2}\\ &Z_1 = \frac{Z}{2q\beta} = \frac{2bc}{(b^2+c^2)^2} + \frac{\gamma}{\beta}\frac{c^2-b^2}{(b^2+c^2)^2}\end{aligned}\right.$$

$$Y_1\frac{\gamma}{\beta} + Z_1 = \left(\frac{\gamma^2}{\beta^2}+1\right)\frac{2bc}{(b^2+c^2)^2}$$

$$Z_1\frac{\gamma}{\beta} - Y_1 = -\left(\frac{\gamma^2}{\beta^2}+1\right)\frac{b^2-c^2}{(b^2+c^2)^2}$$

$$2)\left\{\ \frac{Y\gamma+\beta Z}{Y\beta-\gamma Z} = \sin 2\vartheta\right.$$

1) [illegible] $\frac{\gamma}{\beta} = 3$ [illegible].

$$y_1 = \frac{b^2-c^2}{(b^2+c^2)^2} + 3\,\frac{2bc}{(b^2+c^2)^2} = \cancel{\frac{\ldots}{(b^2+c^2)^2}} = -\,\frac{c^2-b^2-6bc}{(b^2+c^2)^2}$$

$$z_1 = \frac{2bc}{(b^2+c^2)^2} + 3\,\frac{c^2-b^2}{(b^2+c^2)^2} = 3\,\frac{c^2+\frac{2}{3}bc-b^2}{(b^2+c^2)^2}$$

terwijl $c = 1$ cm.

$$\cancel{y_1 = -3\,\frac{1-b^2-\frac{2}{3}b}{(1+b^2)^2}}$$

$$z_1 = +3\,\frac{1-b^2+\frac{2}{3}b}{(1+b^2)^2} \qquad y_1 = -\,\frac{1-b^2-6b}{(b^2+1^2)^2} = \frac{6b-1+b^2}{(b^2+1^2)^2}$$

$$z = \frac{3-3b^2+2b}{(1+b^2)^2}$$

Melanban $V = 0{,}422$

$H = 0{,}197.$

$~~\frac{H}{5} = 0{,}0394~~$

$\beta = \frac{V}{10} = \sin\vartheta \, \frac{H}{\cancel{5}} \qquad \sin\vartheta = 0{,}2142 \qquad \vartheta = 12^\circ 22'$

$c = 1 \qquad y_1 = \frac{y}{2q\beta} = \frac{20b + b^2 - 1}{(1+b^2)^2}$

$z_1 = \frac{z}{2q\beta} = \frac{2b - 10b^2 + 10}{(1+b^2)^2} =$

$\cancel{(H + \delta H)\,(y + \delta H)\sin(\vartheta + \delta\vartheta) = y}$

$\cancel{(H + \delta H)\cos\vartheta\,\delta\vartheta + (H + \delta H)\sin\vartheta = y}$

$\cancel{H\cos\vartheta\,\delta\vartheta + \delta H\sin\vartheta = y}$

$\frac{y\cos\vartheta}{H + y\sin\vartheta} = \Delta\delta = \frac{y}{H}\,\frac{\cos\vartheta}{1 + \frac{y}{H}\sin\vartheta} \qquad 1)$

$\sqrt{(H + y\sin\vartheta)^2 + y^2\cos\vartheta^2} = H + \Delta H$

$\sqrt{H^2 + y^2 + 2Hy\sin\vartheta} = H + \Delta H$

$H\left(1 + \frac{1}{2}\,\frac{y^2 + 2Hy\sin\vartheta}{H^2}\right) = H + \Delta H$

$\cancel{H + \frac{1}{2}\frac{y^2}{H} = H + \Delta H}$

$\cancel{\Delta H = \frac{1}{2}\frac{y^2}{H}}$

$\Delta H = \frac{1}{2}\frac{y^2}{H} + y\sin\vartheta \qquad 2)$

3) 1 ből $\frac{y}{H} = \frac{\Delta\delta}{\cos\vartheta - \Delta\delta\sin\vartheta}$ vagy $\vartheta = 12^\circ 22'$ nál $\frac{y}{H} = \frac{\Delta\delta}{0{,}9768 - \Delta\delta\, 0{,}2142}$

$\Delta\delta$ maximuma $= 20' = 0{,}0058$ e szerint $(\Delta\delta\, 0{,}2142)_{max} = 0{,}0012$

$\left(\frac{y}{H}\right)_{max} = 0{,}00594 \qquad y_{max} = 0{,}00117$ C.S.S

Görbéimben e szerint y_{max} lesz 69 mm

1 mm Ordinata értéke $= \frac{0{,}00117}{69}$ C.S.S $= 0{,}00001695$ C.S.S

$y_{max} = 0{,}00117$ C.S.S
$y_{1\,max} = 6{,}88$ } ezekből tehát ~~β~~ β $\beta = K\frac{V}{10} = K\,0{,}0422$ lesz

$6{,}88 = \frac{0{,}00117}{0{,}0844\,Kq} \qquad Kq = 0{,}00202$

$b=+4 \qquad y_1 = +\frac{95}{289} = 0{,}3287 \qquad z_1 = -\frac{142}{289} = 0{,}4913$

$b=-4 \qquad y_1 = -\frac{65}{289} = 0{,}2249 \qquad z_1 = -\frac{158}{289} = 0{,}5467$

$b=+5 \qquad y_1 = +\frac{124}{676} = 0{,}1834 \qquad z_1 = -\frac{230}{676} = 0{,}3402$

$b=-5 \qquad y_1 = -\frac{76}{676} = 0{,}1124 \qquad z_1 = -\frac{250}{676} = 0{,}3698$

$b=+6 \qquad y_1 = +\frac{155}{1369} = 0{,}1132 \qquad z_1 = -\frac{338}{1369} = 0{,}2469$

$b=-6 \qquad y_1 = -\frac{85}{1369} = 0{,}0621 \qquad z_1 = -\frac{362}{1369} = 0{,}2644$

$b=+7 \qquad y_1 = +\frac{188}{2500} = 0{,}0752 \qquad z_1 = -\frac{466}{2500} = 0{,}1864$

$b=-7 \qquad y_1 = -\frac{92}{2500} = 0{,}0368 \qquad z_1 = -\frac{494}{2500} = 0{,}1976$

$b=+8 \qquad y_1 = +\frac{223}{4225} = 0{,}0528 \qquad z_1 = -\frac{614}{4225} = 0{,}1453$

$b=-8 \qquad y_1 = -\frac{97}{4225} = 0{,}0229 \qquad z_1 = -\frac{646}{4225} = 0{,}1529$

$b=+9 \qquad y_1 = +\frac{260}{6724} = 0{,}0387 \qquad z_1 = -\frac{782}{6724} = 0{,}1163$

$b=-9 \qquad y_1 = -\frac{100}{6724} = 0{,}0149 \qquad z_1 = -\frac{818}{6724} = 0{,}1216$

$b=10 \qquad y_1 = +\frac{299}{10201} = 0{,}0293 \qquad z_1 = -\frac{970}{10201} = 0{,}0951$

$b=-10 \qquad y_1 = -\frac{101}{10201} = 0{,}0099 \qquad z_1 = -\frac{1010}{10201} = 0{,}0990$

Reihe $\frac{r}{p}=0$ $\qquad$ $\left(\frac{r}{p}=3\right)$

$b=0$	$y_1=-p-1$	$z_1=+3$
$b=1$	$y_1=+\frac{6}{4}+1{,}5$	$z_1=+\frac{2}{4}+0{,}5$
$b=-1$	$y_1=-\frac{6}{4}-1{,}5$	$z_1=-\frac{2}{4}-0{,}5$
$b=2$	$y_1=+\frac{15}{25}+0{,}6$	$z_1=-\frac{5}{25}-0{,}2$
$b=-2$	$y_1=-\frac{9}{25}-0{,}36$	$z=-\frac{13}{25}-0{,}52$
$b=3$	$y_1=+\frac{26}{100}+0{,}26$	$z=-\frac{18}{100}-0{,}18$
$b=-3$	$y_1=-\frac{10}{100}-0{,}1$	$z_1=-\frac{30}{100}-0{,}3$
$b=4$	$y_1=+\frac{39}{289}+0{,}1349$	$z_1=-\frac{37}{289}-0{,}1280$
$b=-4$	$y_1=-\frac{9}{289}-0{,}0311$	$z_1=-\frac{53}{289}-0{,}1834$
$b=5$	$y_1=+\frac{54}{676}+0{,}0799$	$z_1=-\frac{62}{676}-0{,}0888$
$b=-5$	$y_1=-\frac{6}{676}-0{,}0089$	$z_1=-\frac{82}{676}-0{,}1213$
$b=6$	$y_1=+\frac{71}{1369}=+0{,}0520$	$z_1=-\frac{93}{1369}-0{,}0679$
$b=-6$	$y_1=-\frac{1}{1369}=-0{,}0007$	$z_1=-\frac{117}{1369}-0{,}0855$
$b=7$	$y_1=+\frac{90}{2500}=+0{,}0360$	$z_1=-\frac{130}{2500}=-0{,}0520$
$b=-7$	$y_1=+\frac{6}{2500}=+0{,}0024$	$z_1=-\frac{158}{2500}=-0{,}0632$
$b=8$	$y_1=+\frac{111}{4225}+0{,}0263$	$z_1=-\frac{173}{4225}-0{,}0409$
$b=-8$	$y_1=+\frac{15}{4225}+0{,}0036$	$z_1=-\frac{205}{4225}-0{,}0485$
$b=9$	$y_1=+\frac{134}{6724}+0{,}0199$	$z_1=-\frac{222}{6724}-0{,}0330$
$b=-9$	$y_1=+\frac{26}{6724}+0{,}0039$	$z_1=-\frac{258}{6724}-0{,}0384$
$b=10$	$y_1=+\frac{159}{10201}+0{,}0156$	$z_1=-\frac{277}{}-0{,}0272$
$b=-10$	$y_1=+\frac{39}{10201}+0{,}0038$	$z_1=-\frac{317}{10201}=-0{,}0311$

$\frac{7}{3}-4-\frac{12}{3}$

-13

-9

$\frac{9}{3}-\frac{12}{3}-\frac{4}{3}$

$17+9$

$\frac{3-27+6}{100}$

$23+16$

$-\frac{25}{16}$

11

$-\frac{48}{37}$ $\quad$ 632

$13-75$ $\quad$ -48, 8, 56

$29+257 \,/\, 260 \,/\, 39$

-31 $\quad$ 25 $\quad$ 26/09

35, 36 $\quad$ -108, 15, 93, $42/15/3$

-37 $\quad$ 120

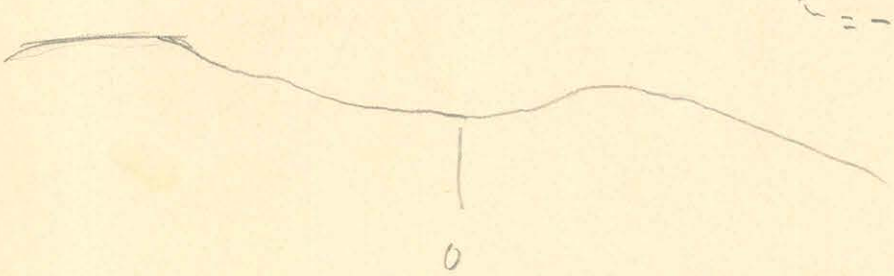
$-43+49$ $\quad$ 38

$\frac{47}{64}$, 111 $\quad$ 147, 17

-49, 64 $\quad$ -147, 14, 157 $\quad$ 53, 81, 134

192, 19, 173 $\quad$ 192, 13, 205 $\quad$ 55, 87, 26

243, 18, 275 $\quad$ 243, 15, 258



0

Rücker $\frac{V}{b}=3$

$b=0{,}1$ $\quad y_1 = -\frac{0{,}39}{1{,}0201} \quad -0{,}3823 \quad z_1 = +\frac{3{,}17}{1{,}0201} \quad +3{,}1075$

$b=-0{,}1$ $\quad y_1 = -\frac{1{,}59}{1{,}0201} \quad -1{,}5586 \quad z_1 = +\frac{2{,}77}{1{,}0201} \quad +2{,}7154$

$b=0{,}2$ $\quad y_1 = + \frac{0{,}24}{1{,}0816} \quad +0{,}2219 \quad z_1 = +\frac{3{,}28}{1{,}0816} = +3{,}0325$

$b=-0{,}2$ $\quad y_1 = -\frac{2{,}16}{1{,}0816} \quad -1{,}9970 \quad z_1 = +\frac{2{,}48}{1{,}0816} = +2{,}2929$

$b=0{,}3$ $\quad y_1 = +\frac{0{,}89}{1{,}1881} \quad +0{,}7491 \quad z_1 = +\frac{3{,}33}{1{,}1881} \quad +2{,}8028$

$b=-0{,}3$ $\quad y_1 = -\frac{2{,}71}{1{,}1881} \quad -2{,}2809 \quad z_1 = +\frac{2{,}13}{1{,}1881} \quad +1{,}7928$

$b=0{,}4$ $\quad y_1 = +\frac{1{,}56}{1{,}3456} \quad +1{,}1593 \quad z_1 = +\frac{3{,}32}{1{,}3456} \quad +2{,}4673$

$b=-0{,}4$ $\quad y_1 = -\frac{3{,}24}{1{,}3456} \quad -2{,}4078 \quad z_1 = +\frac{1{,}72}{1{,}3456} \quad +1{,}2782$

$b=0{,}5$ $\quad y_1 = +\frac{2{,}25}{1{,}5625} \quad +1{,}4400 \quad z_1 = +\frac{3{,}25}{1{,}5625} \quad +2{,}0800$

$b=-0{,}5$ $\quad y_1 = -\frac{3{,}75}{1{,}5625} \quad -2{,}4000 \quad z_1 = +\frac{1{,}25}{1{,}5625} \quad +0{,}8000$

$b=0{,}6$ $\quad y_1 = +\frac{2{,}96}{1{,}8496} \quad +1{,}6003 \quad z_1 = +\frac{3{,}12}{1{,}8496} \quad +1{,}6868$

$b=-0{,}6$ $\quad y_1 = -\frac{4{,}24}{1{,}8496} \quad -2{,}2924 \quad z_1 = +\frac{0{,}72}{1{,}8496} \quad +0{,}3893$

$b=0{,}7$ $\quad y_1 = +\frac{3{,}69}{2{,}2201} \quad +1{,}6621 \quad z_1 = +\frac{2{,}93}{2{,}2201} \quad +1{,}3198$

$b=-0{,}7$ $\quad y_1 = -\frac{4{,}71}{2{,}2201} \quad -2{,}1215 \quad z_1 = +\frac{0{,}13}{2{,}2201} \quad +0{,}0585$

$b=0{,}8$ $\quad y_1 = +\frac{4{,}44}{2{,}6896} \quad +1{,}6508 \quad z_1 = +\frac{2{,}68}{2{,}6896} \quad +0{,}9996$

$b=-0{,}8$ $\quad y_1 = -\frac{5{,}16}{2{,}6896} \quad -1{,}9185 \quad z_1 = -\frac{0{,}52}{2{,}6896} \quad -0{,}1934$

$b=0{,}9$ $\quad y_1 = +\frac{5{,}21}{3{,}2761} \quad +1{,}5903 \quad z_1 = +\frac{2{,}37}{3{,}2761} \quad +0{,}7234$

$b=-0{,}9$ $\quad y_1 = -\frac{5{,}59}{3{,}2761} \quad -1{,}7063 \quad z_1 = -\frac{1{,}23}{3{,}2761} \quad -0{,}3754$

Melun $\frac{I}{p} = 10$

$b = 0 \quad y_1 = -1 \quad z_1 = +10$

$b = +0{,}1 \quad y_1 = +\frac{1{,}01}{1{,}0201} = 0{\cdot}9901 \quad z_1 = +\frac{10{,}1}{1{,}0201} = 9{\cdot}9009$

$b = -0{,}1 \quad y_1 = -\frac{2{,}99}{1{,}0201} = 2{\cdot}9311 \quad z_1 = +\frac{9{,}7}{1{,}0201} = 9{\cdot}5088$

$b = +0{,}2 \quad y_1 = +\frac{3{,}04}{1{,}0816} = 2{\cdot}8106 \quad z_1 = +\frac{10}{1{,}0816} = 9{\cdot}2456$

$b = -0{,}2 \quad y_1 = -\frac{4{,}96}{1{,}0816} = 4{\cdot}5857 \quad z_1 = +\frac{9{,}2}{1{,}0816} = 8{\cdot}5059$

$b = +0{,}3 \quad y_1 = +\frac{4{,}91}{11881} = 4{\cdot}1326 \quad z_1 = +\frac{9{,}7}{11881} = 8{\cdot}1643$

$b = -0{,}3 \quad y_1 = -\frac{7{,}09}{11881} = 5{\cdot}9675 \quad z_1 = +\frac{8{,}5}{11881} = 7{\cdot}1542$

$b = +0{,}4 \quad y_1 = +\frac{7{,}16}{1{,}3456} = 5{\cdot}3210 \quad z_1 = +\frac{9{,}2}{1{,}3456} = 6{\cdot}8371$

$b = -0{,}4 \quad y_1 = -\frac{8{,}84}{1{,}3456} = 6{\cdot}5696 \quad z_1 = +\frac{7{,}6}{1{,}3456} = 5{\cdot}6481$

$b = +0{,}5 \quad y_1 = \frac{9{,}25}{1{,}5625} = 5{\cdot}9200 \quad z_1 = +\frac{8{,}5}{1{,}5625} = 5{\cdot}4400$

$b = -0{,}5 \quad y_1 = -\frac{10{,}75}{1{,}5625} = 6{\cdot}8800 \quad z_1 = +\frac{6{,}5}{1{,}5625} = 4{\cdot}1600$

$b = +0{,}6 \quad y_1 = +\frac{11{,}36}{1{,}8496} = 6{\cdot}1419 \quad z_1 = +\frac{7{,}6}{1{,}8496} = 4{\cdot}1089$

$b = -0{,}6 \quad y_1 = -\frac{12{,}64}{1{,}8496} = 6{\cdot}8339 \quad z_1 = +\frac{5{,}2}{1{,}8496} = 2{\cdot}8114$

$b = +0{,}7 \quad y_1 = \frac{13{,}49}{2{,}2201} = 6{\cdot}0763 \quad z_1 = +\frac{6{,}5}{2{,}2201} = 2{\cdot}9278$

$b = -0{,}7 \quad y_1 = -\frac{14{,}51}{2{,}2201} = 6{\cdot}5357 \quad z_1 = +\frac{3{,}7}{2{,}2201} = 1{\cdot}6666$

$b = +0{,}8 \quad y_1 = +\frac{15{,}64}{2{,}6896} = 5{\cdot}8150 \quad z_1 = +\frac{5{,}2}{2{,}6896} = 1{\cdot}9334$

$b = -0{,}8 \quad y_1 = -\frac{16{,}36}{2{,}6896} = 6{\cdot}0827 \quad z_1 = +\frac{2{,}0}{2{,}6896} = 0{\cdot}7436$

$b = +0{,}9 \quad y_1 = +\frac{17{,}81}{3{,}2761} = 5{\cdot}4363 \quad z_1 = +\frac{3{,}7}{3{,}2761} = 1{\cdot}1294$

$b = -0{,}9 \quad y_1 = -\frac{18{,}19}{3{,}2761} = 5{\cdot}5523 \quad z_1 = +\frac{0{,}1}{3{,}2761} = 0{\cdot}0305$

$b = +1{,}0 \quad y_1 = +\frac{20{,}00}{4} = 5{\cdot}0000 \quad z_1 = +\frac{2{,}00}{4} = +0{\cdot}5000$

$b = -1{,}0 \quad y_1 = -\frac{20{,}00}{4} = 5{\cdot}0000 \quad z_1 = -\frac{2}{4} = -0{\cdot}5000$

$b = +0{,}05 \quad y_1 = +\frac{0{,}0025}{1{,}005006} \quad z_1 = +\frac{10{,}075}{1{,}005006}$

$b = -0{,}05 \quad y_1 = -\underline{1{,}9975} \quad z_1 = +\underline{9{,}875}$

$b = +0{,}06 \quad y_1 = +\underline{0{,}2036}$

$b = +0{,}04 \quad y_1 = -\underline{0{,}1984}$

$b = +0{,}49 \quad y_1 = -\underline{0{,}0176}$

$y_1 = 0$ lesz $b = +0{,}0499$-nél és $b' = -20{,}0499$-nél

$z_1 = 0$ lesz $b = -0{,}90499$ és $b' = 1{,}10499$-nél

$b = +1{,}1$ $\quad y_1 = +\frac{22{,}21}{4{,}8841} = 4{\cdot}5474$ $\quad z_1 = +\frac{0{,}1}{4{,}8841} = 0{\cdot}0205$

$b = -1{,}1$ $\quad y_1 = -\frac{21{,}79}{4{,}8841} = 4{\cdot}4614$ $\quad z_1 = -\frac{4{,}3}{4{,}8841} = 0{\cdot}8805$

$b = +1{,}2$ $\quad y_1 = +\frac{24{,}44}{5{,}9536} = 4{\cdot}1051$ $\quad z_1 = -\frac{2{,}00}{5{,}9536} = 0{\cdot}3359$

$b = -1{,}2$ $\quad y_1 = -\frac{23{,}56}{5{,}9536} = 3{\cdot}9573$ $\quad z_1 = -\frac{6{,}80}{5{,}9536} = 1{\cdot}1421$

$b = +1{,}3$ $\quad y_1 = +\frac{26{,}69}{7{,}2361} = 3{\cdot}6884$ $\quad z_1 = -\frac{4{,}3}{7{,}2361} = 0{\cdot}5942$

$b = -1{,}3$ $\quad y_1 = -\frac{25{,}31}{7{,}2361} = 3{\cdot}4977$ $\quad z_1 = -\frac{9{,}5}{7{,}2361} = 1{\cdot}3129$

$b = +1{,}4$ $\quad y_1 = +\frac{28{,}96}{8{,}7616} = 3{\cdot}3053$ $\quad z_1 = -\frac{6{,}8}{8{,}7616} = 0{\cdot}7761$

$b = -1{,}4$ $\quad y_1 = -\frac{27{,}04}{8{,}7616} = 3{\cdot}0862$ $\quad z_1 = -\frac{12{,}4}{8{,}7616} = 1{\cdot}4152$

$b = +1{,}5$ $\quad y_1 = +\frac{31{,}25}{10{,}5625} = 2{\cdot}9586$ $\quad z_1 = -\frac{9{,}5}{10{,}5625} = 0{\cdot}8994$

$b = -1{,}5$ $\quad y_1 = -\frac{28{,}75}{10{,}5625} = 2{\cdot}7219$ $\quad z_1 = -\frac{15{,}5}{10{,}5625} = 1{\cdot}4674$

$b = +1{,}6$ $\quad y_1 = +\frac{33{,}56}{12{,}6736} = 2{\cdot}6480$ $\quad z_1 = -\frac{12{,}4}{12{,}6736} = 0{\cdot}9784$

$b = -1{,}6$ $\quad y_1 = -\frac{30{,}44}{12{,}6736} = 2{\cdot}4018$ $\quad z_1 = -\frac{18{,}8}{12{,}6736} = 1{\cdot}4834$

$b = +1{,}7$ $\quad y_1 = +\frac{35{,}89}{15{,}1321} = 2{\cdot}3718$ $\quad z_1 = -\frac{15{,}5}{15{,}1321} = 1{\cdot}0243$

$b = -1{,}7$ $\quad y_1 = -\frac{32{,}11}{15{,}1321} = 2{\cdot}1220$ $\quad z_1 = -\frac{22{,}3}{15{,}1321} = 1{\cdot}4737$

$b = +1{,}8$ $\quad y_1 = +\frac{38{,}24}{17{,}9776} = 2{\cdot}1271$ $\quad z_1 = -\frac{18{,}8}{17{,}9776} = 1{\cdot}0457$

$b = -1{,}8$ $\quad y_1 = -\frac{33{,}76}{17{,}9776} = 1{\cdot}8779$ $\quad z_1 = -\frac{26{,}0}{17{,}9776} = 1{\cdot}4462$

$b = +1{,}9$ $\quad y_1 = +\frac{40{,}61}{21{,}2521} = 1{\cdot}9109$ $\quad z_1 = +\frac{22{,}3}{21{,}2521} = 1{\cdot}0493$

$b = -1{,}9$ $\quad y_1 = -\frac{35{,}39}{21{,}2521} = 1{\cdot}6652$ $\quad z_1 = -\frac{29{,}9}{21{,}2521} = 1{\cdot}4069$

$b = +2$ $\quad y_1 = +\frac{43{,}0}{25{,}00} = 1{\cdot}7200$ $\quad z_1 = -\frac{26}{25{,}00} = 1{\cdot}0400$

$b = -2$ $\quad y_1 = -\frac{37{,}0}{25{,}00} = 1{\cdot}4800$ $\quad z_1 = -\frac{34}{25{,}00} = 1{\cdot}3600$

$b = +3$ $\quad y_1 = +\frac{68}{100} = 0{\cdot}6800$ $\quad z_1 = -\frac{74}{100} = 0{\cdot}7400$

$b = -3$ $\quad y_1 = -\frac{52}{100} = 0{\cdot}5200$ $\quad z_1 = -\frac{86}{100} = 0{\cdot}8600$

$0{,}\overline{1}^2 = 0.01$ $\quad 1.1 \times 1.1$ $\quad 13$

$0.2^2 = 0.04$ $\quad 11$ $\quad 39$

$0{,}4^2 = 0.16$ $\quad 121$ $\quad 169$

$1.1^2 = 1.21$

$1.3^2 = 1.69$

$y = 0{,}3$ $\quad \left[1+(1+y)^2\right]\left[1+(1-y)^2\right]$

$(1+\overline{1{,}3}^2)(1+\overline{0{,}7}^2) =$

$(1+1.69)(1+0.49) = 2.69 \cdot 1.49$

1076

2421

40081

$(y+l)(1+(y-l)^2) - (y-l)(1+(y+l)^2)$

$y+l \; + (y-l)^2(y+l)$

$-y+l \; - (y-l)(y+l)^2$

$2l - (y^2-l^2)(-y+l+y+l)$

$2l - (y^2-l^2)2y$

$2l - 2y^3 + 2l^2y$ $\quad 2(l+l^2y-y^3)$

$2l - (y^2-l^2)2l$

$2l + 2l^3 - 2ly^2$

0 $\quad 5$ $\quad 2$ $\quad 3$

$\frac{260}{700}$ $\quad \frac{10}{101}$ $\quad \frac{220}{500}$ $\quad \frac{170}{65.5}$

$\frac{2l+2l^3}{(1+l^2)^2}$ $\quad \frac{100}{101}$ $\quad \frac{60}{65.5}$

$\frac{10+250}{26^2}$

31   961

$$\begin{array}{r} 1325 \\ 325 \\ \hline 6625 \\ 2650 \\ 3975 \\ \hline 430625 \end{array}$$

$$43062 \,/\, 85000 \,/\, 1974$$

$$\begin{array}{r} 85000 \\ 43062 \\ \hline 419380 \\ 387558 \\ \hline 318220 \\ 301434 \\ \hline 167860 \end{array}$$

$$\begin{array}{r} 122 \\ 82 \\ \hline 244 \\ 976 \\ \hline 10004 \end{array}$$

17.5
85

$$85 \,/\, 1400 \,/\, 16$$

$$\begin{array}{r} 1400 \\ 85 \\ \hline 550 \end{array}$$

$$10004 \,/\, 40$$

$$y = \frac{dy}{dy}$$

$$\frac{dy}{dy} = 4y \frac{b^2-c^2}{(b^2+c^2)^2}$$

$$y = 4y \frac{b}{b^2+c^2}$$

$$z = 4y \frac{c}{c^2+b^2}$$

$$\frac{\partial z}{\partial y} = 4y \frac{2bc}{(b^2+c^2)^2}$$

$$\frac{\partial y}{\partial y} = 4y \frac{c^2-b^2}{b^2+c^2}$$

$$y = \frac{b^2+c^2}{2bc} \frac{\partial z}{\partial y} b = \frac{b^2+c^2}{c^2-b^2} \frac{\partial y}{\partial y} b$$

$$z = \frac{b^2+c^2}{2bc} \frac{\partial z}{\partial y} c = \frac{b^2+c^2}{c^2-b^2} \frac{\partial y}{\partial y} c$$

722
361
648
578
282

$$4 - y's = -(y's - 4)$$

$$(1-y) = 1 - y' = (-0{,}1)' = \frac{1}{100} = 0{,}01$$

[illegible] $+0{,}0108$ mm
[illegible] $-0{,}0228$ mm

$$V'-V=\int_1^0 h\,ds = \frac{k}{\lambda(1-\sigma)}\left(\frac{dg}{dx}x+\right.$$

$\underline{X}$

$$\xi=\frac{k}{\lambda(1-\sigma)}\left\{X\frac{\partial^2 U}{\partial x^2}+Y\frac{\partial^2 U}{\partial x\partial y}+Z\frac{\partial^2 U}{\partial x\partial z}\right\} \qquad 1)$$

$$\eta=\frac{k}{\lambda(1-\sigma)}\left\{X\frac{\partial^2 U}{\partial x\partial y}+Y\frac{\partial^2 U}{\partial y^2}+Z\frac{\partial^2 U}{\partial y\partial z}\right\} \qquad 2)$$

$$\zeta=\frac{k}{\lambda(1-\sigma)}\left\{X\frac{\partial^2 U}{\partial x\partial z}+Y\frac{\partial^2 U}{\partial y\partial z}+Z\frac{\partial^2 U}{\partial z^2}\right\} \qquad 3)$$

y

[illegible] $$\frac{\partial^2 U}{\partial x^2}+\frac{\partial^2 U}{\partial y^2}+\frac{\partial^2 U}{\partial z^2}=0$$

[illegible] $$\frac{\partial^2 U}{\partial z^2}=-\frac{\partial^2 U}{\partial x^2}-\frac{\partial^2 U}{\partial y^2}=\left(\frac{\partial^2 U}{\partial y^2}-\frac{\partial^2 U}{\partial x^2}\right)-2\frac{\partial^2 U}{\partial y^2}$$
$$=\left(\frac{\partial^2 U}{\partial x^2}-\frac{\partial^2 U}{\partial y^2}\right)-2\frac{\partial^2 U}{\partial x^2}$$

(1,2) $$\eta X-\xi Y=\frac{k}{\lambda(1-\sigma)}\left\{XY\left(\frac{\partial^2 U}{\partial y^2}-\frac{\partial^2 U}{\partial x^2}\right)+(X^2-Y^2)\frac{\partial^2 U}{\partial x\partial y}+Z\left(X\frac{\partial^2 U}{\partial y\partial z}-Y\frac{\partial^2 U}{\partial x\partial z}\right)\right\}$$

(2,3) $$\zeta Y+2\eta Z=\frac{k}{\lambda(1-\sigma)}\left\{ZY\left(\frac{\partial^2 U}{\partial y^2}-\frac{\partial^2 U}{\partial x^2}\right)+(2Z^2+Y^2)\frac{\partial^2 U}{\partial y\partial z}+2ZX\frac{\partial^2 U}{\partial x\partial y}+XY\frac{\partial^2 U}{\partial x\partial z}\right\}$$

(3,1) $$\zeta X+2\xi Z=\frac{k}{\lambda(1-\sigma)}\left\{-ZX\left(\frac{\partial^2 U}{\partial y^2}-\frac{\partial^2 U}{\partial x^2}\right)+(2Z^2+X^2)\frac{\partial^2 U}{\partial x\partial z}+2ZY\frac{\partial^2 U}{\partial x\partial y}+XY\frac{\partial^2 U}{\partial y\partial z}\right\}$$

ha $Y=0$ akkor

(1,2) … $$\eta=\frac{k}{\lambda(1-\sigma)}\left\{X\frac{\partial^2 U}{\partial x\partial y}+Z\frac{\partial^2 U}{\partial y\partial z}\right\}$$

(2,3) … $$\eta=\frac{k}{\lambda(1-\sigma)}\left\{X\frac{\partial^2 U}{\partial x\partial y}+Z\frac{\partial^2 U}{\partial y\partial z}\right\}$$

(3,1) $$\zeta X+2\xi Z=\frac{k}{\lambda(1-\sigma)}\left\{ZX\left(\frac{\partial^2 U}{\partial x^2}-\frac{\partial^2 U}{\partial y^2}\right)+(2Z^2+X^2)\frac{\partial^2 U}{\partial x\partial z}\right\}$$

$$\xi = \frac{k}{\lambda(\sigma-\sigma_1)}\left\{X\frac{\partial^2 u}{\partial x^2}\cos^2\lambda + Z\frac{\partial^2 u}{\partial x \partial z}\right\}$$

$$\zeta = \frac{k}{\lambda(\rho-\sigma)}\left\{X\frac{\partial^2 u}{\partial x\partial z} - Z\frac{\partial^2 u}{\partial x^2}\right\}$$

$\frac{\cos^2 i}{\cos^2 i} + \frac{\sin^2 i}{\cos^2 i}$

$\frac{\cos^2 i + \sin^2 i}{\cos^2 i}$

$\cancel{\xi Z +}$

$$\xi X + \zeta Z = \frac{k}{\lambda(\rho-\sigma)}\left\{\frac{\partial^2 u}{\partial x^2}\left(X^2\cos^2\lambda + Z^2\right)\right\}$$

$\frac{\sin i}{\cos i}$

$$V = \mathcal{U}\operatorname{tg} i = \Delta\mathcal{U}\operatorname{tg} i + \frac{\mathcal{U}}{\cos^2 i}\Delta i$$

24
24
96
48
58

$0{,}00140 \cdot 2{,}4 + \frac{0{,}18}{16} \cdot \frac{100}{120}$

$0{,}004$

$\underline{\underline{-0{,}006}}$ 24

$0{,}00140$
$\underline{0{,}15}$
$0{,}047 = \frac{k}{\lambda(\rho-\sigma)} 0{,}18\,(6{,}8)\,\frac{\partial^2 u}{\partial x^2}$

$$\frac{1}{68} = \frac{k}{\lambda(\rho-\sigma)}\frac{\partial^2 u}{\partial x^2}$$

$\frac{1}{\cancel{20\,000}}$

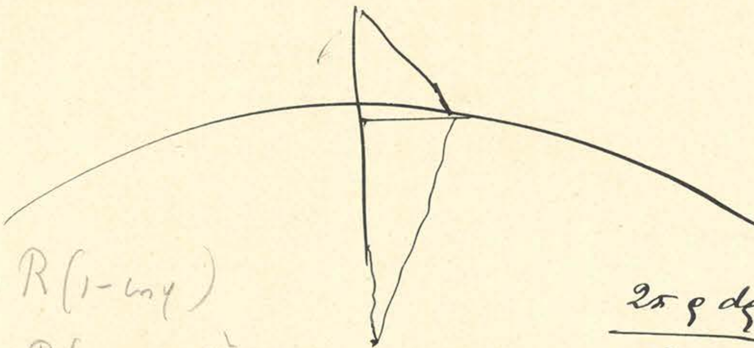
$\frac{4}{5}\ \frac{1}{68}$

$\frac{1{,}15}{9\,1200\ldots}$ 5

340

$\frac{1}{85}$

– R cos



$\cancel{x} = R(1-\cos\varphi)$

$= R\left(1 - 1 + \frac{1}{2}\frac{\varrho^2}{R}\right)$

$$\frac{2\pi\varrho\, d\varrho\, z}{(z^2+\varrho^2)^{\frac{3}{2}}}$$

$$z = h + R - \sqrt{R^2-\varrho^2}$$

$$(h+R)^2 + R^2 - \varrho^2 + \varrho^2$$

$$\int \frac{2\pi\varrho\, d\varrho\,(h+R-\sqrt{R^2-\varrho^2})}{\left((h+R)^2+R^2-2(h+R)\sqrt{R^2-\varrho^2}\right)^{\frac{3}{2}}}$$

ha $R=\infty$ akkor. $\sqrt{R^2-\varrho^2} = R\left(1-\frac{1}{2}\frac{\varrho^2}{R^2}\right)$

$= R$

$R\left(1+\frac{1}{2}\frac{\varrho^2}{R^2}\right)$

$h^2+2hR-2hR \cancel{+} 2hR^2$

h^2+2R^2+2hR

$h^2+2hR+2R^2 \quad \cdot R\,\frac{\varrho^2}{R^2}$

$-2hR-2R^2$

$h^2 - 2h + R\left(1 \frac{1}{2}\frac{\varrho^2}{R}\right)$

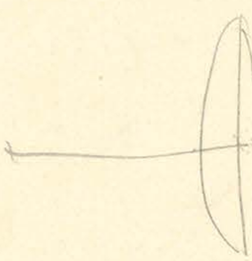
$$h^2+\varrho^2+h\frac{\varrho^2}{R}$$

$z = h.$

$h^2+\left(1+\frac{h}{R}\right)\varrho^2$

$h\,dh$

$\sqrt{R^2-\varrho^2} + h = R + C$



$$X\gamma + \alpha Z = (\gamma^2 + \alpha^2)\frac{\partial^2 U}{\partial x \partial z}$$

$$\gamma = kV \quad \alpha = k\mathfrak{H}.$$

$$X \operatorname{tg} i + Z = \frac{k\mathfrak{H}}{f}(1 + \operatorname{tg}^2 i)\frac{\partial^2 U}{\partial x \partial z} \quad \ldots\ 1)$$

$$Y \operatorname{cotg} \lambda - \frac{X}{\cancel{\;}} = \frac{\mathfrak{H} k \operatorname{tg} i}{f(s-\sigma)}\left(\operatorname{cotg} \lambda \frac{\partial^2 U}{\partial y \partial z} - \frac{1}{\cancel{\;}}\frac{\partial^2 U}{\partial x \partial z}\right)$$

$$X \operatorname{tg} i + Z = \frac{k\mathfrak{H}}{f(s-\sigma)}(1 + \operatorname{tg}^2 i)\frac{\partial g}{\partial x} \quad \ldots\ldots\ 1)$$

$$Y \operatorname{cotg} \lambda - \frac{X}{\cancel{\;}} = \frac{k\mathfrak{H}}{f(s-\sigma)}\left(\operatorname{cotg} \lambda \frac{\partial g}{\partial y} - \frac{1}{\cancel{\;}}\frac{\partial g}{\partial x}\right)\operatorname{tg} i \quad \ldots\ 2)$$

x, y, X, Y a mágneses meridián irányában és Keletre.
λ szöglet az X tengely és a zavaró ~~vonal~~ tengely normalisa között

$\lambda = 56^\circ$ $\quad \mathfrak{H} = 0{,}227.$ $\quad i = 59^\circ 20'$

	γ	α	X	Z	Y
Zara	0,00164	145	~~−0,00118~~ −0,00136	+0,00042	−0,00084
Sebenico	0,00139	129	− ~~0,00091~~ − 0,00088	+0,00204	−0,00109
Spalato	0,00138	138	~~−0,00117~~ −0,00102	+0,00160	−0,00092
Ancona	0,00083	312	+ ~~0,00066~~ +0,00059	+0,00008	+0,00061
Pescara	0,00030	269	~~+0,00005~~ 0	+0,00066	+0,00020

	X	Z	Y
Zara leb Spalato	−0,00109	+0,00135	−0,00095
1 Ancona	+0,00059	+0,00008	+0,00061

Zara – Ancona −0,00168 +0,00127 −0,00156

168
3,4
672
504
−0,00571,2
156
0,00415

$$2Y\gamma\cot\lambda + \alpha Z = 2\gamma^2\cot\lambda\frac{\partial^2 u}{\partial y\partial z} + \alpha^2\frac{\partial^2 u}{\partial x\partial z}$$

$$2\gamma Y\cancel{\cos\lambda} + \alpha Z$$

$$2\gamma Y + \alpha Z = 0$$

$$2Y\gamma\cos\lambda + \alpha Z\sin\lambda = \sin 2\lambda\frac{dy}{ds}\left(\gamma^2 + \frac{\alpha^2}{2}\right)$$

$$2Y\operatorname{tg}i\cos\lambda + Z\sin\lambda = \frac{k\mu}{l(\rho-\sigma)}\left(\frac{1}{2} + \operatorname{tg}^2 i\right)\frac{dy}{ds}\sin 2\lambda$$

$$X\operatorname{tg}i + Z = \frac{k\mu}{l(\rho-\sigma)}(1 + \operatorname{tg}^2 i)\frac{dy}{ds}\cos\lambda$$

$$2\,\cancel{Y\operatorname{tg}}\,i\cos\lambda + Z\sin\lambda - (2X\sin\lambda\operatorname{tg}i + 2Z\sin\lambda) = -\frac{1}{2}\frac{k\mu}{l(\rho-\sigma)}\frac{dy}{ds}\sin 2\lambda$$

$$-Z\cancel{\sin}\lambda = -\frac{k\mu}{l(\rho-\sigma)}\frac{dy}{ds}\cos\lambda$$

$$Z = \frac{k\mu}{l(\rho-\sigma)}\frac{dy}{ds}\cos\lambda$$

$$\eta X = \frac{k}{l(\rho-\sigma)}\left\{X^2\frac{\partial^2 u}{\partial x\partial y} + ZX\frac{\partial^2 u}{\partial y\partial z}\right\}$$

$$2\eta Z = \frac{k}{l(\rho-\sigma)}\left\{2Z^2\frac{\partial^2 u}{\partial y\partial z} + 2ZX\frac{\partial^2 u}{\partial x\partial y}\right\}$$

$Z \quad \xi = X\frac{\partial^2 u}{\partial x^2} + Z\frac{\partial^2 u}{\partial x \partial z}$

$X \quad \zeta = X\frac{\partial^2 u}{\partial x \partial z} - Z\frac{\partial^2 u}{\partial x^2}$

$\boxed{\eta = X\frac{\partial^2 u}{\partial x \partial y} + Z\frac{\partial^2 u}{\partial y \partial z}}$

136
190
326
104

406
135

176
104
285
95

$\xi X + Z\zeta = (Z^2 + X^2)\frac{\partial^2 u}{\partial x \partial z}$

$\cancel{\xi X \quad Z\zeta} = Z^2\frac{\partial^2 u}{\partial x \partial z} + ZX\frac{\partial^2 u}{\partial x^2}$

$\frac{1}{250} = \frac{k}{(\vartheta-\sigma)}$ 15,4

$\frac{1}{120}$

10=22

1) $\eta = \frac{k}{\rho(\vartheta-\sigma)}\mathcal{H}\left\{tg\, i\,\frac{\partial^2 u}{\partial y \partial z}\right\}$

2) $\xi + 2\xi\, tg\, i = \frac{k}{\rho(\vartheta-\sigma)}\mathcal{H}\left\{(1+2\,tg^2 i)\frac{\partial^2 u}{\partial x \partial z}\right\}$

$15{,}6 = 2\frac{\partial^2 u}{\partial y \partial z}$

7,8

$550 = 59\frac{\partial^2 u}{\partial x}$

60

5,78


50
54

$tg\, i = 1{,}7 \quad tg^2 i = 2{,}89$

1) $-0{,}00156 = \frac{k}{\rho(\vartheta-\sigma)}\mathcal{H}.1{,}7\,\frac{\partial^2 u}{\partial y \partial z}$

$-0{,}00415 = \frac{k}{\rho(\vartheta-\sigma)}\mathcal{H}.\,6{,}78\,\frac{\partial^2 u}{\partial x \partial z}$

$\frac{0{,}14}{20} + \frac{0{,}08}{20}$

$\frac{0{,}15}{660000} + \frac{0{,}08}{66000}$

$\frac{0{,}23}{66\,m} \quad \frac{1}{30000}$

$\frac{1}{2}$

Gravitatió és földmágnesség közötti összefüggései

		1903 Jan. 1 Palára				közös 1 helyre redukálva régi [illegible]		
	φ	λ	H	δ	Z	H	δ	Z
1	1018_a	46° 7'887	39° 14'127	0,22116	5° 41'1	0,39488	0,22116	5° 41'1	0,39488
2	1023_a	" 7'873	" 14'475	0,22140	5° 58'7	0,39534	0,22140	58'8	0,39534
3	2188	" 6'283	" 15'061	0,22111	5° 32'4	0,39561	0,22099	32'8	0,39577
4	2184	" 6'473	" 15'242	0,21916	5° 47'8	0,39551	0,21906	48'3	0,39565.

Sub[illegible] rendellenesség

1903 J. 1 Palára és a közös 1 helyre.

	$10^9\frac{\partial^2 U}{\partial x\partial z}$	$10^9\frac{\partial^2 U}{\partial y\partial z}$	$10^9\left(\frac{\partial^2 U}{\partial y^2}-\frac{\partial^2 U}{\partial x^2}\right)$	$10^9\left(\frac{\partial^2 U}{\partial x\partial y}\right)$	X	Y	Z
1	+27,7	+103,9	+7,3	+0,5	0,22007	−0,02191	0,39488
2	+29,6	+62,2	−57,2	−15,1	0,22020	−0,02307	0,39534
3	+81,1	+68,2	+10,4	+19,4	0,21996	−0,02136	0,39577
4	+20,6	+65,1	+17,4	+15,2	0,21794	−0,02216	0,39565

1) egyenletek alapján [illegible] $\alpha = x$ $\beta = y$ $\gamma = z$

$$(-0{,}00116 + 41{,}7Z)x + (-0{,}00013 + 1{,}9Z)y + 64{,}5xy + 15{,}6(x^2-y^2) = 0$$

$$(+0{,}00055 + 35{,}7Z)x + (+0{,}00011 + 53{,}4Z)y - 3{,}1xy - 18{,}9(x^2-y^2) = 0$$

$$(-0{,}00025 + 38{,}8Z)x + (+0{,}00213 - 7{,}1Z)y - 10{,}1xy - 14{,}7(x^2-y^2) = 0$$

$$(-0{,}0116 + 417Z)x + (-0{,}0013 + 19Z)y + 645xy + 156(x^2-y^2) = 0$$

$$(+0{,}0055 + 357Z)x + (+0{,}0011 + 534Z)y - 31xy - 189(x^2-y^2) = 0$$

$$(-0{,}0025 + 388Z)x + (+0{,}0213 - 71Z)y - 101xy - 147(x^2-y^2) = 0$$

$$\begin{cases} (X) = -2387{,}7132 + 50\,253\,297Z \\ (Y) = -896{,}0682 + 23\,258\,553Z \\ (U) = -0{,}02778330 + 3995{,}9739Z - 75\,001\,680Z^2 \\ (V) = -0{,}07014188 - 6099{,}5327Z + 172\,939\,399Z^2 \end{cases}$$

$$\zeta = 10000\, z$$

$$0 = \zeta^4 - \underset{a}{1{,}348348}\,\zeta^3 + \underset{b}{0{,}602985}\,\zeta^2 - \underset{c}{0{,}088548}\,\zeta - \underset{d}{0{,}000398684}$$

ebből $\zeta = 0{,}487$.

és továbbá az 1) egyenlet adja:

$\alpha = -0{,}0000467$

$\beta = -0{,}0001855$

$\gamma = +0{,}0000487$

és $\zeta = -0{,}0043$

és továbbá 1) egyenlet adja

$\alpha' = +0{,}0000326$

$\beta' = +0{,}0000123$

$\gamma' = -0{,}0000004$

a 2) egyenlet alakjai [illegible] $\beta = x$ $\gamma = y$ $\alpha = z$

$$(+0{,}00046 - 1{,}9z)x + (-0{,}00232 + 31{,}2z)y + 64{,}5\,x\cdot y + 41{,}7(x^2+2y^2) = 0$$

$$(+0{,}00089 - 53{,}4z)x + (+0{,}00110 - 37{,}8z)y - 3{,}1\,x\cdot y + 35{,}7(x^2+2y^2) = 0$$

$$(+0{,}00077 + 7{,}1z)x + (-0{,}00050 - 29{,}4z)y - 10{,}1\,xy + 38{,}8(x^2+2y^2) = 0$$

$$(\underset{a}{+0{\cdot}0046} \underset{b}{- 19z})x + (\underset{c}{-0{\cdot}0232} \underset{d}{+ 312z})y \underset{e}{+ 645}xy \underset{f}{+ 417}(x^2+2y^2) = 0$$

$$(+0{\cdot}0089 - 534z)x + (+0{\cdot}0110 - 378z)y - 31xy + 357(x^2+2y^2) = 0$$

$$(+0{\cdot}0077 + 71z)x + (-0{\cdot}0050 - 294z)y - 101xy + 388(x^2+2y^2) = 0$$

$$(X) = -4989{,}5798 + 46\,517\,106\,z$$

$$(Y) = +619{,}0435 - 172\,939\,399\,z$$

$$(U) = -0{,}00969284 - 5011{,}1900z + 150\,010\,732\,z^2$$

$$(V) = +0{,}10447424 - 3074{,}0978z - 100\,504\,675\,z^2$$

$$\zeta = 10000\,z$$

$$\zeta^4 \underset{a}{- 0{,}452460}\,\zeta^3 \underset{b}{+ 0{,}131028}\,\zeta^2 \underset{c}{- 0{,}026535}\,\zeta \underset{d}{+ 0{,}00008812\,4} = 0$$

ebből $\zeta = \pm 0{,}303$	$\zeta = +0{,}003$
és innen	és innen
$\alpha = +0{,}0000303$	$\alpha = +0{,}0000003$
$\beta = +0{,}0000049$	$\beta = -0{,}0000197$
$\gamma = +0{,}0000067$	$\gamma = +0{,}0000022$

Állomás.	D	H	V	$\Delta\varphi$ 46°15'	$\Delta\lambda$ 38° 0'	$\varphi = 46°15'$ $\lambda = 38°0$ helyre redukálva D	$i = 60°40'$ re $\frac{\partial\varphi}{\partial x\partial y} + tg\, i \frac{\partial\varphi}{\partial y\partial z}$	[illegible] D
2325								
2326	5° 58'0'	0.22051	0.39260	− 13.2'	+ 18.0	6° 5'8	−12,4	6° 6'1
2327	6° 0.5	0.21997	230	− 10.7	+ 15.9	6° 7'4	−12,1	6° 6'1
2328	0.9	995	320	− 8.3	+ 14.5	6° 7'3	− 14,3	6° 6'7
2329	3.9	975	357	− 6.1	+ 13.1	6° 9'7	− 17,6	6° 7'6
2330	4.2	945	395	− 3.5	+ 11.7	6° 9'5	− 24,1	6° 9'3
2331	4.5	834	319	− 1.0	+ 10.5	6° 9'3	− 15,6	6° 7'0
2332	—	843	390	+ 1.3	+ 8.5			

δ Erdst-Spannung	$\varphi = 46°15'$ $\lambda = 38°0'$ H	$\varphi = 46°15'$ $\lambda = 38°$ V	i	$\varphi = 46°15'$ $\lambda = 38°0'$ i	{ }
−0'3	0·21927	0·39398	60° 40·7'	60° 54·1'	−56,01
+1'3	895	342	43·2	54·1	−71,62
+0'6	914	407	46·7	55·3	−72,11
+2'1	913	422	49·4	55·9	+26,15
+0'2	905	433	52·8	56·9	−37,90
+2'3	820	332	57·1	58·9	−36,11
	845	379	59·4	58·8	−29,58

Állomás	D	H	V	$\Delta\varphi$ 46° 15'	$\Delta\lambda$ 38° 0'	$\varphi = 46°15'$ $\lambda = 38°0'$-ra redukálva D	$i = 60°50'$-re $tg\, i = 1,7917$. $\frac{\partial U}{\partial x \partial y} + tg\, i \frac{\partial U}{\partial y \partial z}$
2333	6° 8'0'	0·21834	0·39390	+ 3·2	+ 6·1	6° 10,9'	−13,6
2334	3·2	924	444	− 3·1	+ 7·2	6° 6'1	−17,2
2335	5° 58·0'	978	365	− 5·0	+ 4·7	6° 00	− 7,1
2336	55·3	0·22005	279	− 8·0	+ 3·5	5° 56'6	+12,1
2337	57·6	031	283	− 10·8	+ 3·7	5° 58'9	+18,8
2338	57·9	0·34	213	− 13·8	+ 4·1	5° 59'3	+19,4
2339	56·7	043	219	− 16·5	+ 4·7	5° 58'3	+32,5
2340	56·4	041	223	− 14·8	+ 0·9	5° 56'3	+18,5
2341	59·0	025	272	− 12·1	− 0·3	5° 58'4	+12,7
2342	59·9	014	293	− 9·7	− 1·7	5° 58'8	+15,5
2343	6° 2·4'	010	307	− 7·3	− 3·3	6° 0'6	+21,3
2344	4·5	0·21987	336	− 5·0	− 5·1	6° 2'0	+17,9
2345	5° 58·7'	984	438	− 3·0	− 7·5	5° 55'1	+19,5
2346	59·9	914	504	− 0·5	− 9·1	5° 55'7	+16,1
2347	6° 1·5'	860	515	+ 2·4	− 9·5	5° 57'2	+5,6
2348	1·8'	916	486	− 0·7	− 14·0	5° 55'3	+9,4

hibaegyenlet

$\varphi = 46°15'$
$\lambda = 38°0'$-re $D_0 = 6°2'8$

$\delta - \delta_0 = D - D_0 = -k\left(\frac{\partial U}{\partial x \partial y} + tg\, i \frac{\partial U}{\partial y \partial z}\right)$ hibaegyenlet $v = -$

Deklináció δ	δ Észlelt–Számított	$\varphi=46^\circ15'$ $\lambda=38^\circ0'$ ra H	$\varphi=46^\circ15'$ $\lambda=38^\circ0'$ ra V	~~$\varphi=46^\circ15'$ $\lambda=38^\circ$ ra~~ i	$\varphi=46^\circ15'$ $\lambda=38^\circ0'$ redukálva i	$(1+2tg^2i_0)\frac{\partial^2U}{\partial x\partial z}-tg\,i_0\left(\frac{\partial^2U}{\partial y^2}-\frac{\partial^2U}{\partial x^2}\right)$ $i=60^\circ50'$
6° 6'5	+4'4	0·21854	0·39359	61° 0·0'	60° 57·5'	−3,91
6° 7'7	−1'0	892	477	60° 56·0	59·4	−38,64
6° 4,7	−4'7	933	417	49·5	54·4	+123,75
5° 59,5	−2'9	937	360	44·5	52·1	+69,73
5° 57'7	+1'2	940	393	42·9	53·0	+17,63
5° 57'6	+1'7	919	353	40·1	53·0	−4,85
5° 54'0	+4'3	905	386	39·7	55·1	−49,53
5° 57'8	−1'5	921	372	40·0	53·6	−22,08
5° 59'4	−1'0	928	394	42·9	53·9	+37,59
5° 58'6	+0,2	937	390	44·4	53·1	+52,94
5° 57'0	+3,6	954	380	45·2	51·6	+37,17
5° 58'0	+4,0	942	385	47·8	52·0	+69,82
5° 57'5	−2,4	967	466	51·8	54·0	+59,70
5° 58'5	−2,8	919	507	58·9	58·7	+1,74
6° 1'3	−4,1	888	488	61° 2·9	61° 0·0	−15,69
6° 0'3	−5,0	924	489	60° 58·1	60° 57·7	+67,78

...k formájú $v=3Z_0-2X\,tg\,i_0+\left\{(1+2tg^2i_0)\frac{\partial^2U}{\partial x\partial z}-tg\,i_0\left(\frac{\partial^2U}{\partial y^2}-\frac{\partial^2U}{\partial x^2}\right)\right\}kX_0-Z$

Normálegyenletek

$$+207Z_0-30{,}23874\,tg\,i_0+377{,}91\,kX_0-27{,}18987=0$$
$$-30{,}23874Z_0+4{,}41731\,tg\,i_0-55{,}642\,kX_0+3{,}97192=0$$
$$+377{,}91Z_0-55{,}642\,tg\,i_0+61605\,kX_0-47{,}735=0$$

$k=+0{,}000066$

...:

$-\delta_0+k\left(\frac{\partial^2U}{\partial x\partial y}+tg\,i\frac{\partial^2U}{\partial y\partial z}\right)+\delta$

Normálegyenletek

$$+22\delta_0-85{,}3k-38{,}8=0$$
$$-85{,}3\delta_0+6379{,}33k-1483{,}00=0$$

$\delta_0=2{,}81$

$k=0{,}27001$ perc.

$k=0{,}000079$

Állomás	$\varphi = 46°10'$ $+\Delta\varphi$	λ $39°0$ $+\Delta\lambda$	D $5°30'$ $+\delta$	Mágneses meridiánra Topografikus [illegible] $10^9 \frac{\partial^2 U}{\partial y \partial z}$	$10^9 \frac{\partial^2 U}{\partial x \partial y}$	$i = 60°47'$ $10^9\left(\frac{\partial^2 U}{\partial x \partial y} + tg\, i \frac{\partial^2 U}{\partial y \partial z}\right)$
2110	+3·3'	+7·4'	+3·0'	+4·4	−6·3	+1·6
2109	+2·1'	+7·6'	+2·3'	−4·5	+2·8	−5·2
2211	+1·0'	+7·2'	+2·8'	+3·5	+3·1	+9·4
2143	0	+6·8'	+4·9'	−15·4	+9·6	−17·9
2203	−0·2'	+7·5'	+3·3'	−11·3	+5·0	−15·2
2144	−1·3'	+7·0'	+5·1'	−9·3	+8·4	−8·2
2142	−1·0'	+5·4'	+7·5'	−3·2	+8·0	+2·3
2141	+0·3'	+5·2'	+3·3'	−1·4	−0·6	−3·1
2105	+1·0'	+4·9'	+5·2'	+5·4	+1·2	+10·9
2107	+1·6'	+6·2'	+4·4'	+2·0	+1·0	+4·6
2108	+2·8'	+6·1'	+4·2'	−3·6	−0·3	−6·7
2106	+2·3'	+4·9'	+5·3'	−7·9	−0·5	−14·6
2104	+1·6'	+3·4'	+4·7'	−2·9	−3·4	−8·6
2100	+0·7'	+2·7'	+5·8'	−14·0	+4·9	−20·1
2103	+0·4'	+3·6'	+4·1'	−4·1	+2·0	−5·3
2140	−0·7'	+3·7'	+3·4'	+4·9	+3·2	+12·0
2102	−0·1'	+2·2'	+5·9'	−2·5	+1·0	−3·5
1000	+0·5'	+2·1'	+6·4'	−7·3	+0·9	−12·2
2101	+1·1'	+2·0'	+5·9'	−7·9	+2·4	−11·7
2133	+0·8	+0·7	+4·4	−9·0	−3·4	−19·5
2131	+1·4'	−1·2'	+8·7'	−12·8	−0·8	−23·7
2134	+2·5'	−1·0'	+6·1'	−8·8	−1·9	−17·6
2135	+3·5'	−1·0'	+6·2'	−7·4	+4·6	−8·6
2212	+5·8'	−0·9'	+5·7'	−13·7	+4·8	−19·7
2213	+8·0'	−1·2'	+5·6	−5·5	+3·5	−6·3
2136	−0·1'	−0·5'	+8·5'	−7·3	−2·9	−16·0
2137	−1·6'	−0·8'	+5·4'	−6·9	+0·1	−12·2
2138	−2·9'	−1·0'	+6·0	−4·6	−0·9	−9·1
2139	−4·0'	−1·5'	+5·8	−7·0	−1·9	−14·4
2291	−7·0'	−4·1'	+6·6'	+1·8	−7·3	−4·1
2292	−8·6'	−6·0'	+7·5'	−0·2	−1·6	−2·0
2301	−8·8'	−8·9'	+6·2'	+11·3	+1·5	+21·7

Megrendezkedésben $-0{,}456\,\Delta\lambda$ $-0{,}035\,\Delta\varphi$ red. $\gamma_r - \gamma_0$	$H = 0{\cdot}22000 + h$ $+h$ (1906 évi középre red.)
+1'4	+ 31
+0'5	+ 43
+0'6	+ 26
+2'3	+ 12
+1'0	− 8
+2'6	− 16
+4'3	− 22
−1'0	+ 34
+1'8	+ 48
+1'6	+ 50
+1'4	+ 28
+1'9	+ 40
+0'6	+ 29
+1'4	+ 45
0	+ 24
−0'6	+ 3
+1'3	+ 39
+1'8	+ 54
+1'3	+ 51
−0'8	+ 20
+2,6	+ 14
+0,1	+ 19
+0,2	− 1
−0,1	− 2
−0,3	− 56
+2,7	+ 28
−0,6	− 20
−0,2	+ 8
−0,6	+ 60
−1,1	+ 61
−1,2	+ 51
−3,8	+ 62

Állomás	$\varphi = 46°10'$ + $\Delta\varphi$	$\lambda = 39°0'$ + $\Delta\lambda$	D $5°30'$ + δ	Mágneses meridiánra Topografikus rendellenességek $10^9 \frac{\partial^2 U}{\partial y \partial z}$	$10^9 \frac{\partial^2 U}{\partial x \partial y}$	$i = 60°47'$ $10^9\left(\frac{\partial^2 U}{\partial x \partial y} + tg\, i \frac{\partial^2 U}{\partial y \partial z}\right)$
2302	-9.6'	-11.6'	+6.6'	-2.9	-6.8	-12.0
2303	-9.5'	-14.3'	+9.6'	+0.8	-2.2	-0.8
2304	-9.1'	-16.8'	+11.2'	+2,1	+1,0	+3,9
2305	-7.0'	-16.9'	+10.0'	-0.3	-3.3	-3.8
2306	-4.8'	-16.9'	+13.8'	+0.3	-0.9	-0.4
2307	-2.7'	-16.4'	+12.4'	-1.4	-1.1	-3.6
2311	+6.0'	-18.0'	+8.0'	+8.8	-1.0	+14.7
2313	+10.3'	-17.9'	+8.2'	+8.0	-3.4	+10.9
2314	+8.6'	-22.1'	+11.3'	+5.2	-2.5	+6.8
2315	+6.5'	-24.4'	+14.4'	+4.1	+1.0	+8.3
2318	+2.2'	-31.9'	+18.6'	+5.1	-5.0	+4.1
2319	+0.2'	-33.7'	+17.4'	+4.8	-4.2	+4.4
2321	-3.9'	-36.2'	+20.3'	+4.2	-0.9	+6.6
2322	-6.1'	-37.2'	+22.7'	-2.1	+1.2	-2.6

$$v = \delta_0 - k\left(\frac{\partial^2 U}{\partial x \partial y} + tg\, i \frac{\partial^2 U}{\partial y \partial z}\right) + \alpha \Delta\varphi + \beta \Delta\lambda - \delta$$

$$v = ax + by + cz + du + l$$

azaz $a = +1$, $b = -(\ )$, $c = \Delta\varphi$, $d = \Delta\lambda$, $l = -\delta$

$x = \delta_0$, $y = k$, $z = \alpha$, $u = \beta$

$(aa) = +46$	$(ba) = +191,5$	$ca = -14,5$	$da = -245,8$
$(ab) = +191,5$	$(bb) = +5761,69$	$cb = -34,16$	$db = +1470,43$
$(ac) = -14,5$	$(b,c) = -34,16$	$cc = +1047,25$	$dc = +526,37$
$(ad) = -245,8$	$(bd) = +1470,43$	$cd = +526,37$	$dd = +8734,04$
$(al) = -354,7$	$(bl) = -835,80$	$cl = +301,18$	$dl = +4427,67$

Normálegyenletek:

$$+46\,\delta_0 + 191,5\,k - 14,5\,\alpha - 245,8\,\beta - 354,7 = 0$$

$$+191,5\,\delta_0 + 5761,69\,k - 34,16\,\alpha + 1470,43\,\beta - 835,80 = 0$$

$$-14,5\,\delta_0 - 34,16\,k + 1047,25\,\alpha + 526,37\,\beta + 301,18 = 0$$

$$-245,8\,\delta_0 + 1470,43\,k + 526,37\,\alpha + 8734,04\,\beta + 4427,67 = 0$$

$\beta = -0,3563$

$\alpha = -0,0295$

$k = +0,0500$

$\delta_0 = +5,589$

$(D_0)_{II} = 5°35'59$ — elsső [illegible]

$\varphi = 46°10'$

$\lambda = 39°0$

$\mathcal{D}_r - \mathcal{D}_0$	
−4,6	+29
−2,9	+38
−2,4	+26
−3,6	+35
+0,3	+12
−0,9	−
−5,7	−
−5,2	−125
−4,1	−95
−2,0	−86
−1,5	−30
−3,6	−32
−2,0	−7
−0,1	+17

$$(\mathcal{D}_r - \mathcal{D}_0) = -K\left(\frac{\partial^2 U}{\partial x \partial y} + \operatorname{tg} i \frac{\partial^2 U}{\partial y \partial z}\right)$$

$$K = -\frac{\sum(\mathcal{D}_r - \mathcal{D}_0)\left(\frac{\partial^2 U}{\partial x \partial y} + \operatorname{tg} i \frac{\partial^2 U}{\partial y \partial z}\right)}{\sum\left(\frac{\partial^2 U}{\partial x \partial y} + \operatorname{tg} i \frac{\partial^2 U}{\partial y \partial z}\right)^2} = \frac{453,31}{5761,69} = 0,078677 \text{ [illegible]}$$

$$K = 0,001511$$

$(\mathcal{D}_0)_I = 6^\circ 2' 81$

$\varphi = 46^\circ 15'$

$\lambda = 38^\circ 0$

$\alpha = -0,0295$ felhasználásával $(\mathcal{D}_0)_{II}$ és $(\mathcal{D}_0)_I$ ből

$\beta = -0,456$

+0,78523
+0,78609
+0,78620
+0,78577
+0,78609
+0,78670
+0,78627
+0,78717
+0,78545
+0,78562

+2Xyi0 ok

+0,78606
+0,39419
1 18025

−0,78570
−0,78459
−0,78527
−0,78494
−0,78190
−0,78279
−0,78312
−0,78448
−0,78545
−0,78494
−0,78552
−0,78433

−2Xyi0 03.

−9,41306
+0,78442
+0,39394

472726
12275
440,25
+ 44,025
428,03
− 36
3,9419
3942
564,00

7,8606
7859
86465
78605

78
9,41306
4,72726
14,14032

$a + \acute{r}iy - 3Z_0 + Z + 2y_0 X = +1,18025 + 3Z_0 = 44,025\, kX_0$

$a - \acute{r}iy - 3Z_0 + \ldots \ldots = = +1,17836 - 3Z_0 = -36,502\, kX_0$

$0,00189 = 80,527\, kX_0$

11,

$kX_0 = 0,00002347.$

$X_0 = 0,219$ 2142

$k = 0,000107$

0,000291
0,000079.

−14,14032
+12,198264
~~−4,15768~~
27,12296

$1,18024 = +51,273$
$1,17836 = -36,502$
$0,00188 = 87775$

$k = 0,000098$

$x = z_0 \qquad y = y i_0 \qquad z = k X_0$

$$+207x - 30{,}23874y + 377{,}912 - 27{,}18987 = 0$$

6,845523 $\quad -207x + 30{,}23880y - 380{,}90z + 27{,}18987 = 0$

0,547749 $\quad +207x - 30{,}47785y + 33744z - 26{,}14680 = 0$

$\cancel{+0{,}00006y}$

$$-0{,}23911y + 33366{,}09z = -1{,}04307$$

$$+0{,}00006y - 2{,}99z = 0$$

$-47{,}735$
$-99{,}694$
$-147{,}429$

$x \quad y \quad z$

$$v = (3Z_0) + \{\ \} k X_0 - (Z + 2X y i_0)$$

$-54{,}17875$
$27{,}18987$
$-81{,}36862$

$a_1 \qquad [aa] = +207 \qquad bb = +61605$

$\cancel{az = 99}$

$13 \qquad [ab] = +377{,}91 \qquad bl = -147{,}429$

$[al] = -81{,}36862 \qquad 2712$

$x = z_0 \qquad y = k X_0$

$$+207x + 377{,}91y - 81{,}36862 = 0$$

$$\cancel{+377{,}91x + 61605y - 147{,}429 = 0}$$

$$+207x + 33744y - 80{,}75409 = 0$$

$-81{,}850$

$$+33366{,}09y = -0{,}61453$$

$+0{,}481$

$y = -0{,}0000184$

$+0{,}00001442$

$\boxed{k = +0{,}000066}$

$X_0 k A + k_0 k (\lambda - (\ ))$

$3Z_0 + X_0 k \lambda$

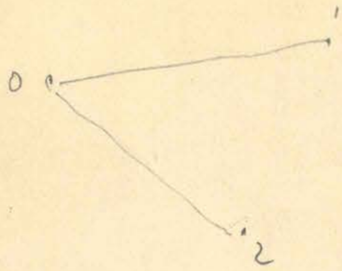
125,97
4600

$+ 491{,}3529$

$- 172{,}55451$

$+ 222{,}28980$

$6964{,}8725$



$$\left(\frac{\partial^2 u}{\partial x^2}\right)_1 - \left(\frac{\partial^2 u}{\partial x^2}\right)_0 = \left(\frac{\partial^2 u}{\partial y^2} - \frac{\partial^2 u}{\partial x^2}\right)_0 - \left(\frac{\partial^2 u}{\partial y^2} - \frac{\partial^2 u}{\partial x^2}\right)_1 + \left\{\left(\frac{\partial^2 u}{\partial y^2}\right)_1 - \left(\frac{\partial^2 u}{\partial y^2}\right)_0\right\}$$

$$\left(\frac{\partial^2 u}{\partial y^2}\right)_1 - \left(\frac{\partial^2 u}{\partial y^2}\right)_0$$

$$\left(\frac{\partial^2 u}{\partial z^2}\right)_1 - \left(\frac{\partial^2 u}{\partial x^2}\right)_1$$

$$\left(\frac{\partial^2 u}{\partial y^2}\right)_1 - \left(\frac{\partial^2 u}{\partial y^2}\right)_0 =$$

$$\frac{\partial}{\partial x}\frac{\partial^2 u}{\partial y^2} = \frac{\partial}{\partial y}\frac{\partial^2 u}{\partial x \partial y}$$

$$\frac{\partial}{\partial y}\frac{\partial^2 u}{\partial y^2} = \frac{\partial}{\partial y}\left(\frac{\partial^2 u}{\partial y^2} - \frac{\partial^2 u}{\partial x^2}\right) + \frac{\partial}{\partial x}\frac{\partial^2 u}{\partial x \partial y}$$

$$d\cdot\frac{\partial^2 u}{\partial y^2} = \frac{\partial}{\partial x}\frac{\partial^2 u}{\partial y^2}dx + \frac{\partial}{\partial y}\frac{\partial^2 u}{\partial y^2}dy$$

$$d\frac{\partial^2 u}{\partial y^2} = \frac{\partial}{\partial y}\frac{\partial^2 u}{\partial x \partial y}dx + \frac{\partial}{\partial y}\left(\frac{\partial^2 u}{\partial y^2} - \frac{\partial^2 u}{\partial x^2}\right)dy + \frac{\partial}{\partial x}\frac{\partial^2 u}{\partial x \partial y}dy$$

$$\left(\frac{\partial^2 u}{\partial y^2}\right)_1 - \left(\frac{\partial^2 u}{\partial y^2}\right)_0 = (x_1 - x_0)\frac{\partial}{\partial y}\frac{\partial^2 u}{\partial x \partial y} + (y_1 - y_0)\left\{\frac{\partial}{\partial y}\left(\frac{\partial^2 u}{\partial y^2} - \frac{\partial^2 u}{\partial x^2}\right) + \frac{\partial}{\partial x}\frac{\partial^2 u}{\partial x \partial y}\right\}$$

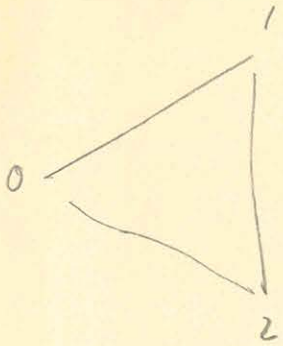
$$\cancel{\left(\frac{\partial^2 u}{\partial x^2}\right)_1 - \left(\frac{\partial^2 u}{\partial x^2}\right)_0} \qquad \frac{\partial}{\partial y}\frac{\partial^2 u}{\partial x^2} = \frac{\partial}{\partial x}\frac{\partial^2 u}{\partial x \partial y}$$

$$\frac{\partial}{\partial x}\frac{\partial^2 u}{\partial x^2} = -\frac{\partial}{\partial x}\left(\frac{\partial^2 u}{\partial y^2} - \frac{\partial^2 u}{\partial x^2}\right) + \frac{\partial}{\partial y}\frac{\partial^2 u}{\partial x \partial y}$$

$$d\frac{\partial^2 u}{\partial x^2} = \frac{\partial}{\partial x}\frac{\partial^2 u}{\partial x^2}dx + \frac{\partial}{\partial y}\frac{\partial^2 u}{\partial x^2}dy$$

$$d\frac{d^2 u}{\partial x^2} = \frac{\partial}{\partial x}\frac{\partial^2 u}{\partial x \partial y}dy - \frac{\partial}{\partial x}\left(\frac{\partial^2 u}{\partial y^2} - \frac{\partial^2 u}{\partial x^2}\right)dx + \frac{\partial}{\partial y}\frac{\partial^2 u}{\partial x \partial y}dx$$

$$\left(\frac{d^2 u}{dx^2}\right)_1 - \left(\frac{\partial^2 u}{\partial x^2}\right)_0 = (y_1 - y_0)\frac{\partial}{\partial x}\frac{\partial^2 u}{\partial x \partial y} - (x_1 - x_0)\left\{\frac{\partial}{\partial x}\left(\frac{\partial^2 u}{\partial y^2} - \frac{\partial^2 u}{\partial x^2}\right) - \frac{\partial}{\partial y}\frac{\partial^2 u}{\partial x \partial y}\right\}$$



	θ	X	y	$\frac{\partial^2 U}{\partial x \partial z}$	$\frac{\partial^2 U}{\partial y \partial z}$	$\left(\frac{\partial^2 U}{\partial y^2} - \frac{\partial^2 U}{\partial x^2}\right)$	$\frac{\partial^2 U}{\partial x \partial y}$
(2272)	0	0	0	+33,7	+13,2	−18,7	+7,4
(2274)	1	+270	+1171	+17,0	−5,9	+0,4	−4,8
(2273)	2	−933	+926	+25,5	+7,4	−37,4	+17,3

$$\frac{\partial}{\partial x}\left(\frac{\partial^2 U}{\partial x \partial y}\right) = -0,017061$$

$$\frac{\partial}{\partial y}\left(\frac{\partial^2 U}{\partial x \partial y}\right) = -0,006496$$

$$\frac{\partial}{\partial x}\left(\frac{\partial^2 U}{\partial y^2} - \frac{\partial^2 U}{\partial x^2}\right) = +0,029484$$

$$\frac{\partial}{\partial y}\left(\frac{\partial^2 U}{\partial y^2} - \frac{\partial^2 U}{\partial x^2}\right) = +0,009513$$

$$\left(\frac{\partial^2 U}{\partial x^2}\right)_1 - \left(\frac{\partial^2 U}{\partial x^2}\right)_0 = -29,7 \qquad \left(\frac{\partial^2 U}{\partial x^2}\right)_2 - \left(\frac{\partial^2 U}{\partial x^2}\right)_0 = +17,8$$

$$\left(\frac{\partial^2 U}{\partial y^2}\right)_1 - \left(\frac{\partial^2 U}{\partial y^2}\right)_0 = -10,6 \qquad \left(\frac{\partial^2 U}{\partial y^2}\right)_2 - \left(\frac{\partial^2 U}{\partial y^2}\right)_0 = -0,9$$

$$\left(\frac{\partial^2 U}{\partial z^2}\right)_1 - \left(\frac{\partial^2 U}{\partial z^2}\right)_0 = +40,3 \qquad \left(\frac{\partial^2 U}{\partial z^2}\right)_2 - \left(\frac{\partial^2 U}{\partial z^2}\right)_0 = -16,9$$

01
$$\begin{cases} X_1 - X_0 = -29,7\alpha - 12,2\beta - 16,7\gamma \\ Y_1 - Y_0 = -12,2\alpha - 10,6\beta - 19,1\gamma \\ Z_1 - Z_0 = -16,7\alpha - 19,1\beta + 40,3\gamma \end{cases}$$

02
$$\begin{cases} X_2 - X_0 = +17,8\alpha + 9,9\beta - 8,2\gamma \\ Y_2 - Y_0 = +9,9\alpha - 0,9\beta - 5,8\gamma \\ Z_2 - Z_0 = -8,2\alpha - 5,8\beta - 16,9\gamma \end{cases}$$

Ihega
$$\begin{cases} X_0 = 0,21753 \quad Y_0 = -0,02008 \quad Z_0 = 0,39358 \\ X_1 = 0,21686 \quad Y_1 = -0,02023 \quad Z_1 = 0,39816 \\ X_2 = 0,21803 \quad Y_2 = -0,01944 \quad Z_2 = 0,39531 \end{cases}$$

0 és 1 pontból
$\alpha = +0,00005241$
$\beta = -0,00015647$
$\gamma = +0,00006121$

0 és 2 ből
$\alpha = +0,00000696$
$\beta = -0,00003861$
$\gamma = -0,00009249$

○ 44

23' −008 355

+2 +47 +57 +3

45
○

○ 46

30' −0,46 390

+18 +79 +15 −5

○ 43

40' 057 367

+37 +28 +13 +9

40' 096 308

+76 +2 +26 +5

○
41

30' 066 380

+29 +102 −14 +2

○ 42

38' 099 326

+7 +34 −5 −10

38 37

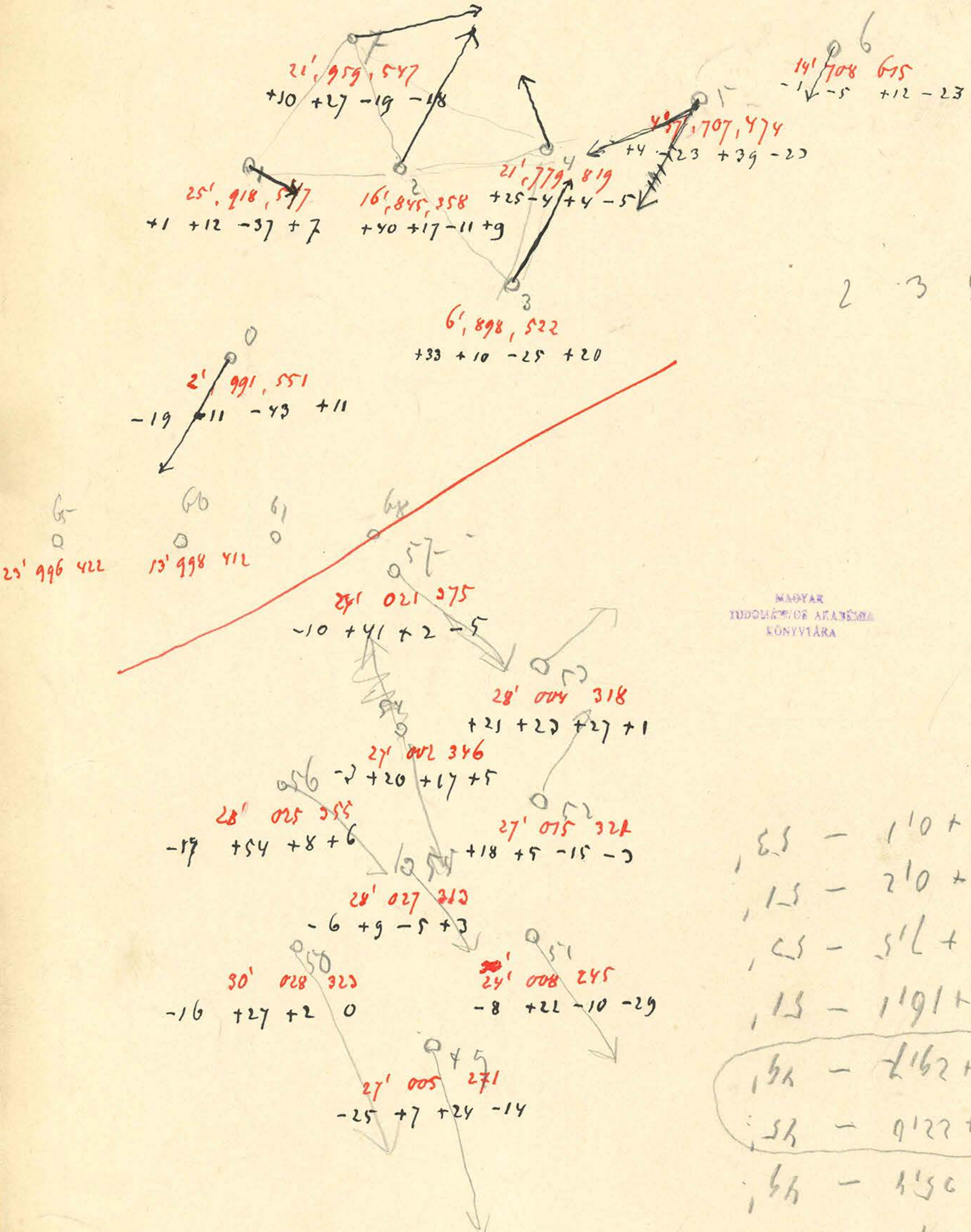
○ ○ ○ 36'

27'

35
○
43'

36 34
○

34
○
33'



2 3 4.

+62,2	+36,9	− 3.4'
+66,5	+31,1	− 37'
+59,2	+32,4	− 32'
+42,3	+26,5	− 39'
+49,5	+27,0	− 45'
+42,7	+32,0	− 47'
+32,0	+24,7	− 48'
+21,3	+21,0	− 48'
+27,1	+35,4	− 49'
+41,6	+22,0	− 45'
+59,7	+29,7	− 46'
+25,6	+16,1	− 51'
+18,2	+7,5	− 53'
+16,4	+0,2	− 51'
+9,0	+0,1	− 53'

+1,697
+1,342

Az I, II, III, egyenletek közelítő megoldásai gyanánt régebbi számítások alapján a következő értékeket használtuk.

$\alpha_0 = +1{,}65$; $\beta_0 = -0{,}15$; $\gamma_0 = +2{,}93$.

Az $I^{*)}$, $II^{*)}$, $III^{*)}$ hibaegyenletek megoldásait a mellékelt számítási lapok alapján a következő táblázat tünteti elő.

Melyik egyenletből?	α	y	z
$I^{*)}$ből	$-1{,}478$	$+0{,}069$	$+0{,}147$
$II^{*)}$ "	$+0{,}336$	$-0{,}568$	$-0{,}293$
$I^{*}+II^{*}$ből	$-0{,}556$	$-0{,}255$	$-0{,}264$
$I^{*)}+II^{*}+III^{*)}$ből	$-1{,}411$	$+0{,}353$	$-1{,}209$

Ezekkel javítva a fenti $\alpha_0, \beta_0, \gamma_0$ értékeket

Melyik egyenletből	α	β	γ
$I^{*)}$ ből	$+0{,}17$	$-0{,}08$	$+3{,}08$
$II^{*)}$ "	$+1{,}99$	$-0{,}72$	$+2{,}64$
$I^{*}+II^{*)}$ "	$+1{,}09$	$-0{,}41$	$+2{,}67$
$I^{*)}+II^{*)}+III^{*)}$ből	$+0{,}24$	$+0{,}20$	$+1{,}72$

állomás	Mágneses $X_{anom.}$	$Y_{anom.}$	$Z_{anom.}$	Gravitatios ([illegible]) $10^9\frac{\partial^2 U}{\partial x\partial z}$	$10^9\frac{\partial^2 U}{\partial y\partial z}$	$10^9\left(\frac{\partial^2 U}{\partial y^2}-\frac{\partial^2 U}{\partial x^2}\right)$	$10^9\frac{\partial^2 U}{\partial x\partial y}$	Mágneses $\xi = X_{anom}-X_K$	$\eta = Y_{anom}-Y_K$	$\zeta = Z_{anom}-Z_K$
2326	+0,00013	−0,00022	−0,00001	−7,6	−6,9	+3,1	+0,6	+0,00008	−0,00022	−0,00006
27	− 21	− 30	− 56	−11,0	−5,1	−2,1	−2,2	− 26	− 30	− 61
28	− 2	− 31	+ 7	−9,3	−3,5	+6,9	−6,8	− 7	− 31	+ 2
29	− 5	− 47	+ 22	−18,8	−8,3	+1,8	−4,1	− 10	− 47	+ 17
30	− 12	− 45	+ 32	−5,3	−13,2	+5,4	−0,2	− 17	− 45	+ 27
31	− 97	− 35	− 70	−4,9	−9,4	+3,7	+1,4	− 102	− 35	− 75
33	− 63	− 50	− 43	−1,4	−7,4	+0,4	−1,1	− 68	− 50	− 48
34	− 23	− 24	+ 79	−6,3	−7,9	+0,6	−2,9	− 28	− 24	+ 74
35	+ 20	+ 13	+ 26	+14,5	−0,9	−4,5	−9,8	+ 15	+ 13	+ 21
36	+ 29	+ 34	− 32	+7,9	+7,4	−7,3	−4,3	+ 24	+ 34	− 37
37	+ 31	+ 19	+ 3	+2,8	+11,5	−1,3	−3,3	+ 26	+ 19	− 2
38	+ 11	+ 19	− 37	−1,1	+11,6	−5,3	−2,6	+ 6	+ 19	− 42
39	− 2	+ 28	− 2	−5,6	+18,7	−2,4	−1,2	− 7	+ 28	− 7
40	+ 15	+ 39	− 13	−0,6	+10,0	+5,9	+0,4	+ 10	+ 39	− 18
41	+ 20	+ 24	+ 7	+6,8	+5,9	+4,8	+0,4	+ 15	+ 24	+ 2
42	+ 30	+ 20	+ 3	+9,0	+8,4	+5,0	−1,6	+ 25	+ 20	− 2
43	+ 41	+ 6	− 9	+6,9	+8,7	+2,8	+3,9	+ 36	+ 6	− 14
44	+ 41	− 3	− 4	+11,2	+7,9	+3,9	+1,2	+ 36	− 3	− 9
45	+ 61	+ 39	+ 77	+9,6	+10,2	+3,8	−0,8	+ 56	+ 39	+ 72
46	+ 13	+ 40	+ 117	+2,8	+8,7	+7,4	−0,3	+ 8	+ 40	+ 112
Középértékek	+0,00005	0	+0,00005	0	+2,3	+1,6	−1,7			

$$(\eta-\gamma B)\alpha+(-\xi+A\gamma)\beta-C\alpha\beta-D(\alpha^2-\beta^2)=0 \quad \ldots \; I)$$

$$(\xi-A\alpha)\beta+(2\eta-2D\alpha)\gamma-C\beta\gamma-B(\beta^2+2\gamma^2)=0 \quad \ldots \; II)$$

$(2\xi -$

ha tesszük $\alpha=\alpha_0+x$, $\beta=\beta_0+y$, $\gamma=\gamma_0+z$ ahol $\alpha_0, \beta_0, \gamma_0$ közelítő értékek

$$(\eta-\gamma_0 B-C\beta_0-2D\alpha_0)x+(-\xi+A\gamma_0-C\alpha_0+2D\beta_0)y+(-B\alpha_0+A\beta_0)z=-[(\eta-\gamma_0 B$$

$$(-A\beta_0-2D\gamma_0)x+(\xi-A\alpha_0-C\gamma_0-2B\beta_0)y+(2\eta-2D\alpha_0-C\beta_0-4B\gamma_0)z=-[(\xi-A$$

K helyébe értékeinek megfelelőleg A B C D 10^9 szeresét a $\frac{\partial^2 U}{\partial x\partial z}$ stb értékeknek kell ...

Számításra $\alpha_0=1,65$ $\beta_0=-0,15$ $\gamma_0=2,93$ — $\xi\ \eta\ \zeta$ helyett azoknak 10^5 szeresét ...

$$(\xi-B\beta_0+C\gamma_0-2A\alpha_0)x+(-2D\gamma_0-B\alpha_0)y+(2\xi-2D\beta_0+C\alpha_0-4A\gamma_0)z=-[(\xi$$

	Gravitatiós			
k.	A $=\left(\frac{\partial^2 u}{\partial x \partial z}\right)-\left(\frac{\partial^2 u}{\partial x \partial z}\right)_k$	B $=\frac{\partial^2 u}{\partial y \partial z}-\left(\frac{\partial^2 u}{\partial y \partial z}\right)_k$	C $=(\;)-(\;)_k$	D $\frac{\partial^2 u}{\partial x \partial y}-\left(\frac{\partial^2 u}{\partial x \partial y}\right)_k$
6	− 7,6	− 9,2	+ 1,5	+ 2,3
1	− 11,0	− 7,4	− 3,7	− 0,5
2	− 9,3	− 5,8	+ 5,3	− 5,1
7	− 18,8	− 10,6	+ 0,2	− 2,4
7	− 5,3	− 15,5	+ 3,8	+ 1,5
5	− 4,9	− 11,7	+ 2,1	+ 3,1
8	− 1,4	− 9,7	− 1,2	+ 0,6
1	− 6,3	− 10,2	− 1,0	+ 1,2
1	+ 14,5	− 3,2	− 6,1	+ 8,1
2	+ 7,9	+ 5,1	− 8,9	+ 2,6
	+ 2,8	+ 9,2	− 2,9	+ 1,6
2	− 1,1	+ 9,3	− 6,9	+ 0,9
	− 5,6	+ 16,4	− 4,0	+ 0,5
	− 0,6	+ 7,7	+ 4,3	+ 2,1
	+ 6,8	+ 3,6	+ 3,2	+ 2,1
	+ 9,0	+ 6,1	+ 3,4	+ 0,1
	+ 6,9	+ 6,4	+ 1,2	+ 5,6
	+ 11,2	+ 5,4	+ 2,3	+ 2,9
	+ 9,6	+ 7,9	+ 2,2	+ 0,9
	+ 2,8	+ 6,4	+ 5,8	+ 1,4

$$\xi - 2\beta D)\gamma + (\xi - B\beta)\alpha + C\alpha\gamma - A(\alpha^2 + 2\gamma^2) = 0 \quad \cdots \mathrm{III}$$

...hk.

$$\gamma_0 B)\alpha_0 + (-\xi + A\gamma_0)\beta_0 - C\alpha_0\beta_0 - D(\alpha_0^2 - \beta_0^2)\Big] \quad \cdots \mathrm{I}^{*)}$$

a hol $\alpha_0 = k X_{k\text{orig}}$

$\beta_0 = k Y_k.$

$$- A\alpha_0)\beta_0 + (2\eta - 2D\alpha_0)\gamma_0 - C\beta_0\gamma_0 - B(\beta_0^2 + 2\gamma_0^2)\Big] \quad \cdots \mathrm{II}^{*)}$$

$\gamma_0 = k.Z_k$

... venni.

$\gamma_2 = \frac{\mu}{666}$ μ = a mágneses permeabilitás, σ a sűrűség

... ente"

tehát $X_k = 0{,}22$ $Y_k = -0{,}02$ $Z_k = 0{,}39$

$$\Big[(\xi - D\beta_0)2\gamma_0 + (\xi - B\beta_0)\alpha_0 + C\alpha_0\gamma_0 - (\alpha_0^2 + 2\gamma_0^2)A\Big] \cdots \mathrm{III}^{*)}$$

és régi számítás $k = 0{,}000075$

így

$\alpha_0 = 0{,}0000165$

$\beta_0 = -0{,}0000015$

$\gamma_0 = 0{,}0000293$

A hibaegyenletek megoldásai.

Hibaegyenletek az I. számú formula alapján.

Hiba egyenletek I egyenletekből

$-24 \cdot x$	$-604 \cdot y$	$+163 \cdot z$	$= -69$
-72 "	$+0$ "	$+139$ "	$= +124$
$+36$ "	-275 "	$+110$ "	$= +50$
-80 "	-447 "	$+203$ "	$= +130$
-40 "	-53 "	$+264$ "	$= +27$
-106 "	$+832$ "	$+201$ "	$= +222$
-237 "	$+657$ "	$+162$ "	$= +471$
$+18$ "	$+108$ "	$+178$ "	$= -48$
-53 "	$+357$ "	$+31$ "	$= -94$
$+91$ "	$+131$ "	-96 "	$= -224$
-137 "	-135 "	-156 "	$= +155$
-122 "	$+19$ "	-152 "	$= +164$
-223 "	-30 "	-262 "	$= +340$
$+102$ "	-195 "	-126 "	$= -243$
$+70$ "	-10 "	-70 "	$= -166$
$+23$ "	-43 "	-114 "	$= -39$
-311 "	-194 "	-116 "	$= +335$
-280 "	-79 "	-106 "	$= +378$
$+132$ "	-318 "	-145 "	$= -285$
$+175$ "	-98 "	-110 "	$= -327$

$(aa) = +416287$ $\quad (ab) = -181547$ $\quad (ac) = +1699$ $\quad (al) = -627613$

$(ba) = -181547$ $\quad (bb) = +2.133023$ $\quad (bc) = +201732$ $\quad (bl) = +445551$

$(ca) = +1699$ $\quad cb = +201732$ $\quad (cc) = +485074$ $\quad (cl) = +82840$

						I Egyenlet				
Állomás	η	$-\gamma_0 D$	$-C\beta_0$	$-2D\alpha_0$	$\underline{\underline{a}}$	$-\xi$	$+A\gamma_0$	$-C\alpha_0$	$+2D\beta_0$	$\underline{\underline{b}}$
2326	− 22,00	+ 26,96	+ 0,23	− 7,59	− 2,40	− 8,00	− 22,27	− 2,48	− 0,69	− 60,44
27	− 30,00	+ 21,68	− 0,56	+ 1,65	− 7,23	+ 26,00	− 32,23	+ 6,11	+ 0,15	+ 0,03
28	− 31,00	+ 16,99	+ 0,80	+ 16,83	+ 3,62	+ 7,00	− 27,25	− 8,75	+ 1,53	− 27,47
29	− 47	+ 31,06	+ 0,03	+ 7,92	− 7,99	+ 10,00	− 55,08	− 0,33	+ 0,72	− 44,69
30	− 45	+ 45,42	+ 0,57	− 4,95	− 3,96	+ 17,00	− 15,53	− 6,27	− 0,45	− 5,25
31	− 35	+ 24,28	+ 0,32	− 10,23	− 10,63	+ 102,00	− 14,36	− 3,47	− 0,93	+ 83,24
33	− 50	+ 28,42	− 0,18	− 1,98	− 23,74	+ 68,00	− 4,10	+ 1,98	− 0,18	+ 65,70
34	− 24	+ 29,89	− 0,15	− 3,96	+ 1,78	+ 28,00	− 18,46	+ 1,65	− 0,36	+ 10,83
35	+ 13	+ 9,38	− 0,92	− 26,73	− 5,27	− 15,00	+ 42,49	+ 10,07	− 2,43	+ 35,13
36	+ 34	− 14,94	− 1,34	− 8,58	+ 9,14	− 24,00	+ 23,15	+ 14,69	− 0,78	+ 13,06
37	+ 19	− 26,96	− 0,44	− 5,28	− 13,68	− 26,00	+ 8,20	+ 4,78	− 0,48	− 13,50
38	+ 19	− 27,25	− 1,04	− 2,95	− 12,24	− 6,00	− 3,22	+ 11,39	− 0,27	+ 1,90
39	+ 28	− 48,05	− 0,60	− 1,65	− 22,30	+ 7,00	− 16,41	+ 6,60	− 0,15	− 2,96
40	+ 39	− 22,56	+ 0,65	− 6,93	+ 10,16	− 10,00	− 1,76	− 7,10	− 0,63	− 19,49
41	+ 24	− 10,55	+ 0,48	− 6,93	+ 7,00	− 15,00	+ 19,92	− 5,28	− 0,63	− 0,99
42	+ 20	− 17,87	+ 0,51	− 0,33	+ 2,31	− 25,00	+ 26,37	− 5,61	− 0,03	− 4,27
43	+ 6	− 18,75	+ 0,18	− 18,48	− 31,05	− 36,00	+ 20,22	− 1,98	− 1,68	− 19,44
44	− 3	− 15,82	+ 0,35	− 9,57	− 28,04	− 36,00	+ 32,82	− 3,80	− 0,87	− 7,85
45	+ 39	− 23,15	+ 0,33	− 2,97	+ 13,21	− 56,00	+ 28,13	− 3,63	− 0,27	− 31,77
46	+ 40	− 18,75	+ 0,87	− 4,62	+ 17,50	− 8,00	+ 8,20	− 9,57	− 0,42	− 9,79

$-B\alpha_0$	$+A\beta_0$	$\underline{C}$	$\eta\alpha_0$	$-\alpha_0\gamma_0 B$	$-\frac{\xi}{3}\beta_0$	$+\gamma_0\beta_0 A$	$-\alpha_0\beta_0 C$	$-(\alpha^2-\beta^2)D$	
+ 15,18	+ 1,14	+16,32	− 36,30	+ 44,48	+ 1,20	+ 3,34	+ 0,37	− 6,20	+ 6,89
+ 12,21	+ 1,65	+13,86	− 49,50	+ 35,78	− 3,90	+ 4,83	− 0,92	+ 1,35	− 12,36
+ 9,57	+ 1,40	+10,97	− 51,15	+ 28,04	− 4,05	+ 4,09	+ 4,31	+ 13,77	− 4,99
+ 17,49	+ 2,82	+20,31	− 77,55	+ 57,25	− 4,50	+ 8,26	+ 0,05	+ 6,48	− 13,01
+ 25,58	+ 0,80	+26,38	− 74,25	+ 74,93	− 2,55	+ 2,33	+ 0,94	− 4,05	− 2,65
+ 19,21	+ 0,74	+20,05	− 57,75	+ 56,56	− 15,30	+ 2,15	+ 0,52	− 8,37	− 22,19
+ 16,00	+ 0,21	+16,21	− 82,50	+ 46,89	− 10,20	+ 0,62	− 0,30	− 1,62	− 47,11
+ 16,83	+ 0,95	+17,78	− 39,60	+ 49,31	− 4,20	+ 2,77	− 0,25	− 3,24	+ 4,79
+ 5,28	− 2,18	+3,10	+ 21,45	+ 15,47	+ 3,25	− 6,37	− 4,51	− 21,87	+ 9,42
− 8,42	− 1,19	−9,61	+ 56,10	− 24,66	+ 3,60	− 3,47	− 3,20	− 7,02	+ 22,35
− 15,18	− 0,42	−15,60	+ 34,35	− 44,48	+ 3,90	− 1,23	− 0,72	− 4,32	− 15,50
− 15,35	+ 0,17	−15,18	+ 21,35	− 44,96	+ 0,90	+ 0,48	− 4,71	− 3,45	− 16,27
− 27,06	+ 0,84	−26,22	+ 46,20	− 79,29	− 4,05	+ 2,46	− 0,99	− 4,35	− 34,02
− 12,71	+ 0,09	−12,62	+ 64,35	− 37,25	+ 4,50	+ 0,26	+ 4,06	− 5,67	+ 24,27
− 5,94	− 1,02	−6,96	+ 39,60	− 17,40	+ 2,25	− 2,99	+ 0,79	− 5,67	+ 16,58
− 10,07	− 1,35	−11,42	+ 23,00	− 29,49	+ 3,75	− 3,96	+ 0,84	− 0,27	+ 3,87
− 10,56	− 1,04	−11,60	+ 9,90	− 30,94	+ 5,40	− 3,05	+ 0,30	− 15,12	− 33,49
− 8,91	− 1,68	−10,59	− 4,95	− 26,11	+ 5,40	− 4,92	+ 0,57	− 7,85	− 37,84
− 13,04	− 1,44	−14,48	+ 64,35	− 38,19	+ 8,40	− 4,22	+ 0,57	− 3,45	+ 28,45
− 10,56	− 0,42	−10,98	+ 66,00	− 30,94	+ 1,20	− 1,23	+ 4,44	− 3,78	+ 32,69

II. formula alapján

Hibaegyenletek a II. számú formula alapján.

Állomás	a	b	c	l
2326	−146 x	− 6 y	+565 z	= −67
27	+13	−342	+278	= +389
28	+285	+1	+236	= +329
29	+112	+443	+382	= +770
30	−96	+200	+873	= +154
31	−189	−766	+572	= +230
33	−37	−451	+115	= +1257
34	−80	+843	+674	= −100
35	−453	+140	+359	= −506
36	−141	−224	−17	= −900
37	−90	+46	−755	= +626
38	−54	−172	−750	= +543
39	−38	+188	−1385	= +2148
40	−124	−273	−185	= −803
41	−113	−175	−6	= −612
42	+8	−250	−313	= −127
43	−318	−270	−813	= +1247
44	−153	−326	−785	= +1333
45	−38	+521	−172	= −766
46	−78	+923	+12	= −973

aa = +565.780 ab = +182.893 ac = +187.280 al = +31.116

ba = +182.893 bb = +3.461.076 bc = +738.408 bl = −2.122.594

ca = +187.280 cb = +738.408 cc = +6.774.015 cl = −2.344.197

II. számú formula

állomás	$-A\beta_0$	$-2\Delta\gamma_0$	a	ζ	$-A\alpha_0$	$-C\gamma_0$	$-2B\beta_0$	b	2η	$-2D\alpha_0$
2326	−1,14	−13,48	−14,62	−6,00	+12,54	−4,40	−2,76	−0,62	−44	−7,59
27	−1,65	+2,93	+1,28	−61	+18,15	+10,84	−2,22	−34,23	−60	+1,65
28	−1,40	+29,89	+28,49	+2	+15,35	−15,53	−1,74	+0,08	−62	+16,83
29	−2,82	+14,06	+11,24	+17	+31,02	−0,59	−3,18	+44,25	−94	+7,92
30	−0,80	−8,79	−9,59	+27	+8,75	−11,13	−4,65	+19,97	−90	−4,95
31	−0,74	−18,17	−18,91	−75	+8,09	−6,16	−3,51	−76,57	−70	−10,23
33	−0,21	−3,52	−3,73	−48	+2,31	+3,52	−2,91	−45,08	−100	−1,98
34	−0,95	−7,03	−7,98	+74	+10,40	+2,93	−3,06	+84,27	−48	−3,96
35	+2,18	−47,47	−45,29	+21	−23,93	+17,87	−0,96	+13,98	+26	−26,73
36	+1,19	−15,24	−14,05	−37	−13,04	+26,08	+1,53	−22,43	+68	−8,58
37	+0,42	−9,38	−8,96	−2	−4,62	+8,50	+2,76	+4,64	+38	−5,28
38	−0,17	−5,27	−5,44	−42	+1,82	+20,22	+2,79	−17,17	+38	−2,97
39	−0,84	−2,93	−3,77	−7	+9,24	+11,72	+4,92	+18,78	+56	−1,65
40	−0,09	−12,31	−12,40	−18	+0,99	−12,60	+2,31	−27,30	+78	−6,93
41	+1,02	−12,31	−11,29	+2	−11,22	−9,38	+1,08	−17,52	+48	−6,93
42	+1,35	−0,59	+0,76	−2	−14,85	−9,96	+1,83	−24,98	+40	−0,33
43	+1,04	−32,82	−31,78	−14	−11,39	−3,52	+1,92	−26,99	+12	−18,48
44	+1,68	−16,99	−15,31	−9	−18,48	−6,74	+1,62	−32,60	−6	−9,57
45	+1,44	−5,27	−3,83	+72	−15,84	−6,45	+2,37	+52,08	+78	−2,97
46	+0,42	−8,20	−7,78	+112	−4,62	−16,99	+1,92	+92,31	+80	−4,62

alapján

$-C_1\beta_0$	$-4B\gamma_0$	c	$\zeta\beta_0$	$-A\alpha_0\beta_0$	$2\eta\gamma_0$	$-2D\alpha_0\gamma_0$	$-C\beta_0\gamma_0$	$-B(\beta_0^2+\gamma_0^2)$	l
+ 0,23	+ 107,82	+ 56,46	+ 0,90	− 1,88	− 128,92	− 22,24	+ 0·66	+ 158·17	+ 6·69
− 0,56	+ 86,73	+ 27,82	+ 9,15	− 2,70	− 175,80	+ 4·83	− 1·63	+ 127·22	− 38·93
+ 0,80	+ 67,98	+ 23,61	− 0,30	− 2,30	− 181·66	+ 49·31	+ 2,33	+ 99·71	− 32·91
+ 0,03	+ 124,23	+ 38,18	− 2,55	− 4,64	− 275·42	+ 23·21	+ 0,09	+ 182·24	− 77·07
+ 0,57	+ 181,66	+ 87,28	− 4,05	− 1,31	− 263·70	− 14·50	+ 1,67	+ 266·48	− 15·41
+ 0,32	+ 137,12	+ 57,21	+ 11,25	− 1,21	− 205·10	− 29·97	+ 0,92	+ 201·15	− 22·96
− 0,18	+ 113,68	+ 11,52	+ 7,20	− 0,35	− 293·00	− 5,80	− 0,53	+ 166·76	− 125·72
− 0,15	+ 119,54	+ 67,43	− 11,10	− 1,56	− 140·64	− 11·60	− 0,44	+ 175·36	+ 10·02
− 0,92	+ 37,50	+ 35,85	− 3,15	+ 3,58	+ 76·18	− 78·32	− 2,68	+ 55·01	+ 50·62
− 1,34	− 59,77	− 1,69	+ 5,55	+ 1,95	+ 199·24	− 25·14	− 3,92	− 87·68	+ 90·00
− 0,44	− 107,82	− 75,54	+ 0,30	+ 0,69	+ 111·34	− 15·47	− 1,28	− 158·17	− 62·59
− 1,04	− 109,00	− 75,01	+ 6,30	− 0,27	+ 111·34	− 8·70	− 3,04	− 159·89	− 54·26
− 0,60	− 192,21	− 138,46	+ 1,05	− 1,38	+ 164·08	− 4·83	− 1,76	− 281·95	− 24·79
− 0,65	− 90,24	− 18,52	+ 2,70	− 0,15	+ 228·54	− 20·30	+ 1,89	− 132·38	+ 80·30
+ 0,48	− 42,19	− 0,64	− 0,30	+ 1,68	+ 140·64	− 20·30	+ 1,41	− 61·89	+ 61·24
− 0,51	− 71,49	− 31,31	+ 0,30	+ 2,22	+ 117·20	− 0,96	+ 1,50	− 104·87	+ 15·39
+ 0,18	− 75,01	− 81,31	+ 2,10	+ 1,70	+ 35·16	− 54·15	+ 0,54	− 110·03	− 124·68
+ 0,35	− 63,29	− 78,51	+ 1,35	+ 2,77	− 17·58	− 28·04	+ 1,01	− 92·84	− 133·33
+ 0,33	− 92,59	− 17,23	− 10,80	+ 2,37	+ 228·54	− 8·70	+ 0,97	− 135·82	+ 76·56
+ 0,87	− 75,01	+ 1,24	− 16,80	+ 0,69	+ 234·40	− 13·54	+ 2,55	− 110·03	+ 97·27

III. formula alapján.

Hibaegyenletek az I. formula alapján.

Állomás	a	b	c	l
2326	+22·1 x	+17 y	+1082 z	= +1942
27	−36·7	+151	+707	= −542
28	+47·4	+395	+1022	= +1692
29	+78·0	+316	+2004	= +3407
30	+53·3	+168	+348	= +656
31	−19·8	+81	−1422	= −6154
33	−48·4	+125	−1214	= −4578
34	+903	+98	+166	= +765
35	−392	−422	−1476	= −1927
36	−885	−237	−585	= −1182
37	−184	−246	+149	= +823
38	−562	−206	+138	= −429
39	+22	−300	+452	= +438
40	−23	−250	+348	= +645
41	−105	−183	−438	= −268
42	−208	−107	−498	= −178
43	−323	−434	−52	= +605
44	−384	−259	−546	= −129
45	+480	−183	+34	= +2690
46	+1207	−188	−68	= +2062

aa = +5 670 489. ba = + 985 258, ca = + 4 532 158 al = + 14 147 491.
ab = +985,258 bb = +1 197 898 cb = + 1 746 460. bl = + 456 177.
ac = + 4 532 158. bc = + 1 746 460 cc = + 13 993 499 cl = + 29 143 061.

Ellenőrizve.

III. számú formula

Állomás.	ζ	$-B.\beta_0$	$C\gamma_0$	$-2A\alpha_0$	a	$-2D\gamma_0$	$-B\alpha_0$	b	2ξ	-2…
2326	−6	−1,38	+4,40	+25,08	+22·10	−13,48	+15,18	+1·70	+16	+ [illegible]
27	−61	−1,11	−10,84	+36·30	−36·65	+2,93	+12,21	+15·14	−52	− [illegible]
28	+2	−0,87	+15,53	+30,69	+47·35	+29,89	+9,57	+39,46	−14	− [illegible]
29	+17	−1,59	+0,59	+62,04	+78·04	+14,06	+17,49	+31,55	−20	− [illegible]
30.	+27	−2,33	+11,13	+17,49	+53·29	−8,79	+25,58	+16,79.	−34	+ [illegible]
31	−75	−1,76	+6,15	+16,17	−19·81	−11,17	+19,31	+8,14.	−204	+ [illegible]
33	−48	−1,46	−3,52	+4,62	−48·36	−3,52	+16,01	+12,49.	−136	+ [illegible]
34	+74	−1,53	−2,93	+20,79	+90·33	−7,03	+16,83	+9,80.	−56	+ [illegible]
35	+21	−0,48	−11,87	−47,85	−39·20	−47,47	+5,28	−42,19.	+30	+ [illegible]
36	−37	+0,7	−26,08	−26,07	−88·45	−15,24	−8,42	−23,66.	+48	+ [illegible]
37	−2	+1,38	−8·50	−9,24	−18·36	−9,38	−15,18	−24,56.	+52	+ [illegible]
38	−42	+1,40	−20·22	+4,62	−56·20	−5,27	−15,35	−20,62.	+12	+ [illegible]
39	−7	+2,46	−11·72	+18,48	+2·22	−2,93	−27,06	−29,99.	−14	+ [illegible]
40	−18	+1,16	+12·60	+1,98	−2·26	−14,31	−12,71	−25,02.	+20	+ [illegible]
41	+2	+0,54	+9·38	−22,44	−10·52	−12,31	−5,94	−18,25.	+30	+ [illegible]
42	−2	+0,92	+9·96	−29,70	−20·82	−0,59	−10,07	−10,66.	+50	+ [illegible]
43	−14	+0,96	+3,52	−22,77	−32·29	−32,82	−10,56	−43,38	+72	+ [illegible]
44	−9	+0,81	+6,74	−36,96	−38·41	−16,99	−8,91	−25,90.	+72	+ [illegible]
45	+72	+1,19	+6,45	−31,68	+47·96	−5,27	−13,04	−18,31.	+112	+ [illegible]
46	+112	+0,96	+16·99	−9,24	+120·71	−8,20	−10,56	−18,76.	+16	+ [illegible]

alapján

$D\beta_0$	$C\alpha_0$	$-bA\gamma_0$	c	$\xi 2\gamma_0$	$-2D\beta_0\gamma_0$	$\zeta\alpha_0$	$-B\alpha_0\beta_0$	$C\alpha_0\gamma_0$	$-A(\alpha_0^2+\gamma_0^2)$	l
69	+2,48	+89,07	+108·24	+46,88	+1,02	−9,90	−2,28	+7·25	+157·18	+194·15
15	−6,11	+128,92	+70·66	−152·36	−0,22	−100,65	−1,84	−17·89	+218·81	−54·15
53	+8,75	+109,00	+102·22	−41,02	−2,24	+3,30	−1,44	+25·63	+185·00	+169·23
72	+0,33	+220,34	+199·95	−58,60	−1,06	+28,05	−2,63	+9,97	+373·97	+340·70
45	+6,27	+62,12	+34·84	−99,62	+0,66	+44,55	−3,84	+18·37	+105·43	+65·55
93	+3,47	+57,43	−142·17	−597·72	+1,36	−123·75	−2,90	+19,15	+97·47	−615·39
18	−1,98	+16,41	−121·39	−398·48	+0,26	−79·20	−2,41	−5,80	+27·85	−457·78
36	−1,65	+73,84	+16·55	−164·08	+0,57	+122·10	−2,53	−4,83	+125·32	+76·49
43	−19,07	−169,94	−147·58	+87·90	+3,56	+34·65	−0,79	−29·49	−288·43	−192·65
78	−14,69	−92,59	−58·50	+140·64	+1,14	−61·05	+1,26	−43·03	−157·15	−118·19
48	−4,79	−32,82	+14·87	+152·36	+0,70	−3·30	+2,28	−14·02	−55·70	+82·32
27	−11,39	+12,89	+13·77	+35·16	+0,40	−69·30	+2,31	−33·36	+21·88	−42·91
15	−6,60	+65,63	+45·18	−41,02	+0,22	−11,55	+4,07	−19·34	+111·40	+43·78
63	+7,10	+7,03	+34·76	+58·60	+0,92	−29·70	+1,91	+20·79	+11·94	+64·46
63	+5,28	−79,70	−43·79	+87·90	+0,92	+3·30	+0,89	+15·47	−135·27	−26·79
03	+5,61	−105,48	−49·84	+146·50	+0,04	−3·30	+1,57	+16·44	−179·03	−17·84
68	+1,98	−80,87	−5·21	+210·96	+2,46	−23·10	+1,59	+5·80	−137·25	+60·46
87	+3,80	−131,26	−54·59	+210·96	+1,28	−14·85	+1,34	+11,12	−222·79	−12·94
27	+3,63	−112,57	+3·39	+328·16	+0,40	+118·80	+1,96	+10·64	−190·96	+269·00
42	+9,57	−32,82	−6·83	+46·88	+0,62	+184·80	+1,59	+28·04	−55·70	+206·23

Mind a harmukból mint 3

Mind a kérrmukból.

0,7096727 | $+6.652556x + 986554y + 4.721137z = -14.743988$

4,785240 | $+986604x + 6.791997y + 2,686600z = -2.133220$

$+4.721137x + 2,686600y + 21,252588z = -31.404418$

$+4.721137x + 700130y + 3.350462z = -10.463406$

$+4.721137x + 32,501336y + 12,856026z = -10.297970$

16,0089032 | $1.986470y + 17.902126z = -20.941012$

$31.801206y + 9.505564z = + 255436$

$31.801206y + \cancel{15,217365}z = -335.242630$

286.593399

$\cancel{143.668086}z = -334.987194$

$271087835z =$

21.642895
20.941012
0,701883

14743988
348581
15.092579
5707650
9,384929

−9.384929
−5.707650
−15,092579
348581
14743998

$z = -1,20895667$

$y = +0,35333180$

$x = -1,41072529$

1650

2930
1209
1721

$\gamma = -1,721$

$\beta = +0,203$

$\alpha = +0,239$

I. egyenlet.

0,43611018 | + 416287 x − 181547 y + 1699 z = − 627613
− 181547 x + 2,133023 y + 201732 z = + 445551
106,855209 + 1699 x + 201732 y + 4850742 z = + 82840

− 181547 x + 2.133023 y + 201732 z = + 445551
+ 181547 x − 79174 y + 741 z = − 273708
+ 181547 x + 21.556115 y + 51.8326842 z = + 8.851886

11,534021 | + 2.053849 y + 202473 z = + 171843
+ 23.689138 y + 52.0344162 z = + 9297437
+ 23.689138 y + 2.3353282 z = + 1982041

+ 49.6990882 z = 7,315396

171843
29803
142040

627613
250
627863
125554
502309

627860
12555
615308

12555

z = + 0,14719377
y = + 0,06915796
x = − 1,47808603
jó

71400
+ 13951
85351
2050
83201
85351
2511
82840

165
148

− 2050

$\alpha = + 0{,}17 \quad \beta = - 0{,}08$
$\gamma = + 3{,}08$

29,3
1,5

289
64
353

0,6. tg = 5

i = 78

0,18

0,0289
64
0,0353

0,18 / 308 / 19
128
108

86°20'

II egyenlet

$$
\begin{array}{l|l}
0{\cdot}33101205 & +565780x + 182893y + 187280z = +31116 \\
1{\cdot}02398670 & +182893x + 3461076y + 738408z = -2122594 \\
 & \underline{+187280x + 738408y + 6774015z = -2344197} \\
 & +187280x + 60540y + 61992z = +10300 \\
 & +187280x + 3544096y + 756120z = -2173508
\end{array}
$$

$$
\begin{array}{l|l}
5{,}1389887 & +6778868y + 6712023z = -2354497 \\
 & +3483556y + 694128z = -2183808 \\
 & +3483556y + 34493010z = -12099733
\end{array}
$$

$$+33798882z = -9915925$$

$$
\begin{array}{r}
-2354497 \\
\underline{+1969175} \\
-385322
\end{array}
$$

$$
\begin{array}{r}
+31116 \\
+103962 \\
\underline{+54944} \\
+190022
\end{array}
$$

Próba

$$
\begin{array}{rr}
+62900 & -2014578 \\
 & \underline{-221831} \\
 & -2236409 \\
 & \underline{+62900} \\
 & -2173509
\end{array}
$$

$z = -0{\cdot}29338027$

$y = -0{\cdot}56843220$

$x = +0{\cdot}33585846$

Jó

Àtmidkettőből.

$0{,}19242984 + 982067x + 1346y + 188979z = -596497$

$140{,}400445 + 1346x + 5.594099y + 940140z = -1.677043$

$\cancel{140{,}400445} + 188979x + 940140y + 7259089z = -2.261357$

$+ 188979x + 259y + 36365z = -114784$

$+ 188979x + 785414017y + 1319960797z = -235457592$

$835{,}65237 + 9398817y + 7222724z = -2146573$

$+785413758y + 1319597147z = -235342808$

$+785413758y + 6035686212z = -1793788750$

$5903726498z = -1558445942$

-2146573
$+1906630$
-239943

$z = -0{\cdot}26397664$
$y = -0{\cdot}25529082$
$x = -0{\cdot}55624208$

jó

$-596497 \quad + 344$
$+50230 \quad 49886$
$-546267 \quad +50230$

(30)

Próba

-105118
-240009
-1916230
-2261357

$$X = + \begin{vmatrix} 220-114Z, & -34, & -37 \\ -100+84Z, & +65, & +59 \\ -200+29Z, & -30, & -23 \end{vmatrix}$$

$$\begin{array}{r} 1770 \\ -1495 \\ \hline 275 \end{array} \qquad \begin{array}{r} -1110 \\ +782 \\ \hline 328 \\ +2405 \\ -2006 \\ \hline 399 \end{array} \qquad \begin{array}{r} +3277 \\ +11742 \\ \hline 15019 \end{array}$$

$$+275(220-114Z) - 328(-100+84Z) + 399(-200+29Z)$$

$$\begin{array}{r} +60500 \\ +32800 \\ \hline +93300 \\ -79800 \\ \hline +13500 \end{array} \qquad \begin{array}{r} -31350Z \\ -27552Z \\ \hline -58902 \\ +11571Z \\ \hline -47331Z. \end{array} \qquad \begin{array}{r} +60500 \\ -32800 \\ -79800 \\ \hline -112600 \\ 60500 \\ \hline -52100 \end{array} \qquad \begin{array}{r} 11571 \\ 27552 \\ \hline +39123 \\ 31350 \\ \hline 7773 \end{array} \qquad \begin{array}{r} -22600 \\ -11890 \\ \\ +27360 \\ +22660 \\ \hline +50020 \\ 34490 \\ \hline 15530. \end{array}$$

$$+275(-410+113Z) - 328(+170-10Z) + 399(+240-103Z)$$

$$\begin{array}{r} -112750 \\ -55760 \\ \hline 168510 \\ 95760 \\ \hline -72750 \end{array} \qquad \begin{array}{r} +31075Z \\ +3280Z \\ \hline 34355 \\ -41097 \\ \hline -6742Z. \end{array} \qquad \begin{array}{r} 95760 \\ 55760 \\ \hline +151520 \\ 112750 \\ \hline 38770 \end{array} \qquad \begin{array}{r} +9492 \\ 1140 \end{array} \qquad \begin{array}{r} -41097 \\ 3280 \\ \hline -44377 \\ -34000 \quad 31075 \\ 24000 \quad \overline{13302} \end{array} \qquad \begin{array}{r} +4920 \\ +2000 \end{array}$$

$$\begin{array}{r} +82000 \\ 52800 \\ \hline 29200 \end{array} \qquad \begin{array}{r} -10300 \\ -20160 \\ \hline -30460 \\ 6930 \\ \hline -23530 \end{array} \qquad \begin{array}{r} +8652 \\ 290 \\ \hline 8362 \end{array}$$

$$U = + \begin{vmatrix} -37, & -410+113Z, & +220-114Z \\ +59, & +170-10Z, & -100+84Z \\ -23, & +240-103Z, & -200+29Z \end{vmatrix}$$

$$\begin{array}{r} -41000 \\ 37400 \end{array} \qquad \begin{array}{r} -34440 \\ -11300 \\ \hline -45740 \\ 21580 \end{array} \qquad \begin{array}{r} +2200 \\ 19280 \end{array}$$

$$-37(-10000-23530Z+8362Z^2) - 59(+29200+15530Z+\cancel{15019Z^2})$$

$$-23(-78400-24160Z+8352Z^2)$$

$$+450400+510020Z-1{,}287611Z^2$$

$$-794000-515370Z+1511103Z^2$$

Kürschák féle számítás 1913 március

	Mágneses anomáliák			Gravitációs értékek			
	X_a	Y_a	Z_a	$\frac{\partial^2 U}{\partial x \partial z}$	$\frac{\partial^2 U}{\partial y \partial z}$	$\left(\frac{\partial^2 U}{\partial y^2} - \frac{\partial^2 U}{\partial x^2}\right)$	$\frac{\partial^2 U}{\partial x \partial y}$
2330	−0,00012	−0,00045	+0,00032	−5,3	−13,2	+5,4	−0,2
2335	+ 20	+ 13	+ 26	+14,5	− 0,9	− 4,5	−9,8
2342	+ 30	+ 20	+ 3	+ 9,0	+ 8,4	+ 5,0	− 1,6
Közép	+ 13	− 4	+ 20	+ 6,1	− 1,9	+ 2,0	− 3,9
	ξ	η	ζ	A	B	C	D
2330	− 25	− 41	+ 12	−11,4	− 11,3	+ 3,4	+ 3,7
2335	+ 7	+ 17	+ 6	+ 8,4	+ 1,0	− 6,5	− 5,9
2342	+ 17	+ 24	− 17	+ 2,9	+ 10,3	+ 3,0	+ 2,3

I egyenletek [illegible] véve $\alpha = x$ $\beta = y$ $\gamma = z$

$$(-410 + 113z)x + (+250 - 114z)y - 34xy - 37(x^2 - y^2) = 0$$
$$(+170 - 10z)x + (-70 + 84z)y + 65xy + 59(x^2 - y^2) = 0$$
$$(+240 - 103z)x + (-170 + 29z)y - 30xy - 23(x^2 - y^2) = 0$$

$$X = -22040 + 7773z$$
$$Y = -38770 + 13302z$$
$$U = +192800 - 60400z - 2055z^2$$
$$V = -194900 + 111390z - 15357z^2$$

Negyedfokú egyenlet

$$z^4 - 8{,}222485z^3 + 20{,}533320z^2 - 9{,}197853z - 16{,}201407 = 0$$

innen

$$z = +3{,}0573$$

$X = +1724$; $Y = +1898$ és $U = -11069$

$x = \frac{U}{Y} = -5{,}831928$ és $y = \frac{U}{X} = -6{,}420534$

$\alpha = x = -5{,}83$; $\beta = y = -6{,}42$; $\gamma = z = +3{,}06$