Ms 5103/4 - Sötét László: Jegyzetei. Török influencia

(3) Földi influ-
encia / mágnesség

Barycentrikus hanyagon földi influentiával magyarázott törvény mágneses helei.

X mágneses meridián irányában

Y keletre

Z lefelé $\quad x = \varrho\cos\alpha \quad y = \varrho\sin\alpha$

$$\frac{\partial^2 U}{\partial x^2} = -\frac{1}{(\varrho^2+c^2)^{\frac{3}{2}}} + 3\frac{\varrho^2\cos^2\alpha}{(\varrho^2+c^2)^{\frac{5}{2}}} \qquad \frac{\partial^2 U}{\partial y^2} = -\frac{1}{(\varrho^2+c^2)^{\frac{3}{2}}} + 3\frac{\varrho^2\sin^2\alpha}{(\varrho^2+c^2)^{\frac{5}{2}}}$$

$$\frac{\partial^2 U}{\partial z^2} = -\frac{1}{(\varrho^2+c^2)^{\frac{3}{2}}} + 3\frac{c^2}{(\varrho^2+c^2)^{\frac{5}{2}}}$$

$$\frac{\partial^2 U}{\partial x\partial y} = +\frac{3}{2}\frac{\varrho^2\sin 2\alpha}{(\varrho^2+c^2)^{\frac{5}{2}}}$$

$$\frac{\partial^2 U}{\partial x\partial z} = -3\frac{\varrho c\cos\alpha}{(\varrho^2+c^2)^{\frac{5}{2}}}$$

$$\frac{\partial^2 U}{\partial y\partial z} = -3\frac{\varrho c\sin\alpha}{(\varrho^2+c^2)^{\frac{5}{2}}}$$

Mágnesség $\alpha = \kappa H$

$\beta = 0$

$\gamma = \kappa V$

Igazolás $\quad \frac{\partial U}{\partial x} = \frac{a-x}{r^3} \quad \frac{\partial U}{\partial y} = \frac{b-y}{r^3} \quad \frac{\partial U}{\partial z} = \frac{c-z}{r^3}$

$$\frac{\partial^2 U}{\partial x^2} = -\frac{1}{r^3} + 3\frac{(a-x)^2}{r^5} \qquad \frac{\partial^2 U}{\partial y^2} = -\frac{1}{r^3} + 3\frac{(b-y)^2}{r^5} \qquad \frac{\partial^2 U}{\partial z^2} = -\frac{1}{r^3} + 3\frac{(c-z)^2}{r^5}$$

$$\frac{\partial^2 U}{\partial x\partial y} = 3\frac{(a-x)(b-y)}{r^5} \qquad \frac{\partial^2 U}{\partial x\partial z} = 3\frac{(a-x)(c-z)}{r^5} \qquad \frac{\partial^2 U}{\partial y\partial z} = 3\frac{(b-y)(c-z)}{r^5}$$

Tehát $\quad a = b = 0 \quad c = c \quad z = 0 \quad r^2 = \varrho^2 + c^2$

$x = \varrho\cos\alpha \quad y = \sin\alpha$

Az összes változás $\delta_1 H$ a barycentrikus törvény miatt.

$\delta_2 H$ a föld miatt $\quad \Delta H = \Delta X$

$\varrho = 0 \; -2$

$\varrho = +1 \; -5$

$\varrho = -1 \; +5$

$$\Delta H = \delta_1 H + \delta_2 H$$

$$\frac{1}{\alpha'}\quad \delta_1 H = \kappa H\left(-\frac{1}{(\varrho^2+c^2)^{\frac{3}{2}}} + 3\frac{\varrho^2\cos^2\alpha}{(\varrho^2+c^2)^{\frac{5}{2}}}\right) - \kappa V\, 3\frac{\varrho c\cos\alpha}{(\varrho^2+c^2)^{\frac{5}{2}}}, \quad \text{~~}\delta_2 H = \varrho c\cos\alpha\text{~~}$$

$$\frac{1}{\alpha'}\quad \delta_1 Y = \kappa H\frac{3}{2}\frac{\varrho^2\sin 2\alpha}{(\varrho^2+c^2)^{\frac{5}{2}}} - \kappa V\, 3\frac{\varrho c\sin\alpha}{(\varrho^2+c^2)^{\frac{5}{2}}}, \quad \text{~~}\delta_2 H = \varrho\sin\text{~~}$$

$$\frac{1}{\alpha'}\quad \delta_1 Z = -\kappa H\, 3\frac{\varrho c\cos\alpha}{(\varrho^2+c^2)^{\frac{5}{2}}} + \kappa V\left(-\frac{1}{(\varrho^2+c^2)^{\frac{3}{2}}} + 3\frac{c^2}{(\varrho^2+c^2)^{\frac{5}{2}}}\right)$$

$$\Delta y = \frac{3}{2}\left(\frac{\rho^2}{(\rho^2+1)^{\frac{5}{2}}}\sin 2\varphi + \rho\left(\frac{1}{\sqrt{2}}-\frac{4}{(\rho^2+1)^{\frac{5}{2}}}\right)\sin\varphi\right)$$

ρ	ρ^2	ρ^2+1	$\log(\rho^2+1)^{\frac{5}{2}}$	$\log \rho$	$\log \rho^2$	(b) $\frac{\rho^2}{(\rho^2+1)^{\frac{5}{2}}}$	$\left(\frac{1}{\sqrt{2}}-\frac{4}{(\rho^2+1)^{\frac{5}{2}}}\right)$ $-\frac{4}{(\rho^2+1)^{\frac{5}{2}}}$	$\frac{a}{}$ (a) $\left(\frac{1}{\sqrt{2}}-\frac{4\rho}{(\rho^2+1)^{\frac{5}{2}}}\right)\rho$
0,1	0,01	1,01	0,010805	0,0000 -1	0,00000-2	0,00975₄	-3,1987	-0,31937
0,2	0,04	1,04	0,042585	0,301030-1	0,602060-2	0,03626	-2,9163	-0,58386
0,3	0,09	1,09	0,093565	0,477121-1	954242-2	0,07255	-2,5176	-0,75528
0,4	0,16	1,16	0,161145	0,602060-1	204120-1	0,11040	-2,0529	-0,82116
0,5	0,25	1,25	0,242275	0,698970-1	397940-1	0,14311	-1,5826	-0,79130
0,6	0,36	1,36	0,333850	0,778151-1	556302-1	0,16690	-1,1516	-0,69036
0,7	0,49	1,49	0,432965	0,845098-1	690196-1	0,18081	-0,7689	-0,53823
0,8	0,64	1,64	0,537110	0,903090-1	806180-1	0,18581	-0,4542	-0,36336
0,85	0,7225	1,7225	0,590400	0,929419-1	858838-1	0,18554	-0,3199	-0,27191
0,90	0,81	1,81	0,644200	0,954243-1	908486-1	0,18377	-0,2004	-0,18036
0,95	0,9025	1,9025	0,698315	0,977724-1	955448-1	0,18077	-0,0941	-0,08940
1,0	1,000	2,00	0,752575	0,0,0000	00000–	0,17678	0,0000	0,0
1,05	1,1025	2,1025	0,806840	0,021189	0,042378	0,17200	+0,0830	+0,08715
1,10	1,21	2,21	0,860980	0,041393	0,082786	0,16665	+0,1562	+0,17182
1,15	1,3225	2,3225	0,914890	0,060698	0,121396	0,16088	+0,2205	+0,25359
1,20	1,44	2,44	0,968475	0,079181	0,158362	0,15484	+0,2770	+0,33240
1,25	1,5625	2,5625	1,021660	0,096910	0,193820	0,14865	+0,3266	+0,40821
1,30	1,69	2,69	1,074380	0,113943	0,227886	0,14240	+0,3701	+0,48108
1,4	1,96	2,96	1,178230	0,146128	0,292256	0,13002	+0,4418	+0,61845
1,5	2,25	3,25	1,279710	0,176091	0,352182	0,11877	+0,4971	+0,74557
1,6	2,56	3,56	1,378625	0,204120	0,408240	0,10706	+0,5398	+0,86373
1,7	2,89	3,89	1,474875	0,230449	0,460898	0,09683	+0,5731	+0,97425
1,8	3,24	4,24	1,568415	0,255273	0,510546	0,08753	+0,5991	+1,07834
1,9	3,61	4,61	1,659255	0,278754	0,557508	0,07911	+0,6195	+1,17695
2,0	4,00	5,00	1,747425	0,301030	0,602060	0,07155	+0,6356	+1,27112

	H	Z				
Gyulafehérvár	2,1884	4,0031	5)	2,2302	+0,042	2,20
× Kolozsvár	2,1752	4,0426		2,1771	+0,002	2,18
Telvinz	2,1688	4,0058	2			
Dés	2,1672	4,0039				
× N. Szeben	2,1987.	4,0317.	[illegible]	2,2669	+0,067	~~2,269~~ ~~2,183-7~~ 2,188 2,23
Medgyes	2,1831	4,0194	4)			
Beszterce	2,1736	3,9992				
× Marosvásárhely	2,1762	4,0605		2,1914	+0,015	
Abrudbánya	2,1699	3,9882	1)			
Segesvár	2,1872	3,9992	3)			
Fogaras	2,1816	3,9714	7	2,2207	+0,034	2,20
Szék. Udvarhely	2,1860	3,9781		2,2297	+0,048	
Brassó	2,1808	4,0017				
Csík Szereda	2,1905	3,9796				
Kézdi vásárhely	2,1906	3,9472				

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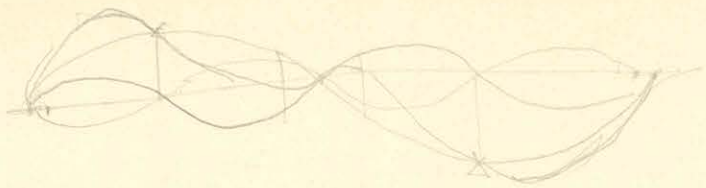
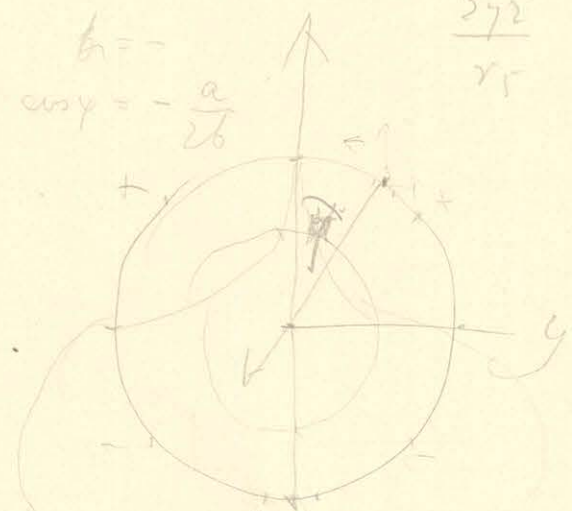


$$-\frac{3}{2}\,\frac{4-\sqrt{2}}{4\sqrt{2}} = -\frac{3}{8}(2\sqrt{2}-1)$$

$$a\cos\gamma + b\cos\gamma\cos\chi = 0$$

$$\cos\gamma = -\frac{a}{2b}$$



$$\frac{3yz}{r^5}$$

$$-\frac{3y^2z}{r^5}$$

$$-\frac{3\rho^2\sin\varphi C}{r^5}$$

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

$$\frac{1}{r^3} - 3\frac{\rho^2\cos^2\alpha}{r^5}$$

$$\frac{r^2+\rho^2-3\rho^2\cos^2\alpha}{r^5}$$

$$\frac{r^2+\rho^2\cos^2\alpha-2\rho^2\cos^2\alpha}{r^5}$$

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

$$\frac{\partial^2 U}{\partial x\partial y} = \frac{3}{2}\frac{\rho^2\sin 2\alpha}{r^5}$$

$$\frac{\partial^2 U}{\partial x\partial z} = -3\frac{\rho\cos\alpha\, c}{r^5}$$

$$\frac{\partial^2 U}{\partial y\partial z} = -3\frac{\rho\sin\alpha\, c}{r^5}$$

$$\rho^2 + c^2 = 3c^2$$

$$\rho^2 = 2c^2$$

$$\rho = 0 \qquad r^2 = \rho^2 + c^2$$

$$\Delta U = \alpha_1\frac{-r^2+3\rho^2\cos^2\varphi}{r^5} - \gamma 3\frac{\rho c\cos\varphi}{r^5}$$

$$\Delta y = \alpha_1\frac{3}{2}\frac{\rho^2\sin 2\alpha}{r^5} - \gamma 3\frac{\rho c\sin\varphi}{r^5}$$

$$\Delta z = -\alpha 3\frac{\rho c\cos\alpha}{r^5} + \gamma\frac{-r^2+3c^2}{r^5}$$

$$\rho^2 = c^2 = 1 \qquad r^2 = 2 \qquad \alpha = 1 \quad \gamma = 2$$

$$\Delta U = \frac{-2+3\cos^2\varphi}{4\sqrt{2}} - \frac{6\cos\varphi}{4\sqrt{2}} = \frac{\cos 2\varphi - 6\cos\varphi}{4\sqrt{2}}$$

$$\Delta y = \frac{3}{2}\frac{\sin 2\varphi}{4\sqrt{2}} - 6\frac{\sin\varphi}{4\sqrt{2}} = \frac{3}{2}\frac{\sin 2\varphi - 4\sin\varphi}{4\sqrt{2}}$$

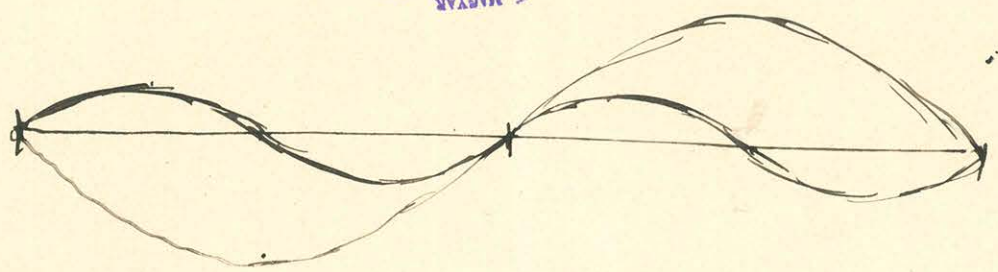
$$\Delta z = -3\frac{\cos\varphi}{4\sqrt{2}} + 2\frac{-2+3}{4\sqrt{2}} = \frac{2-3\cos\varphi}{4\sqrt{2}}$$

$$3\rho^2\cos\alpha - 6\rho c + 6\rho^2(\rho^2+c^2)^{\frac{5}{2}}$$

$$\Delta y = \frac{3}{8\sqrt{2}}\sin 2\varphi - \frac{3}{\sqrt{2}}\sin\varphi$$

$$\Delta y = \frac{3}{2}\frac{\rho^2\sin 2\alpha}{r^5} + \left(\frac{3}{2\sqrt{2}} - 6\frac{\rho c}{r^5}\right)\sin\varphi$$

$$\Delta y = \frac{3}{2}\left(\frac{\rho^2}{(\rho^2+1)^{\frac{5}{2}}}\sin 2\varphi + \left(\frac{1}{\sqrt{2}} - \frac{4\rho}{(\rho^2+1)^{\frac{5}{2}}}\right)\sin\varphi\right)$$



8766
7071
1695

121

$a \sin\varphi + b \sin 2\varphi = 0$

$a + \frac{b}{2}\cos\varphi = 0$

221

0,3444
1,7220
0,8610

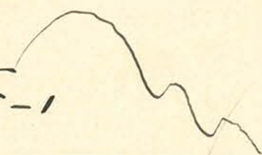
26 | 17 | 65
156
140

$\boxed{\cos\varphi = -\frac{2a}{b}}$

ha $b > 2a$.

0,0828
8610
0,2218 −1

0,6435
8610
0,7825 −1



105
420

1667.

7071
6060
1011

2,1025

7071
6551
0,0520

0,3227
1,6135
0,8068

0,0424
0,8068
0,2356 −1

1720

0,6232
8068
0,8164 −1

0

1,81

172 | 0,1040 |
1032

0,6077

0,2577
1,2885
0,6443

201.7.15

800
688
1120

52° 57′

0,9085 −1
0,6443
0,2642 −1

0,1838

0,5563
0,6443
0,9120 −1

0,8166