

Ms 5104/1-3. Sötros Loránd ^{veles} jegyzeti. Magyarorsz

3 kötet. bor.

1912. ÉV 12. SZ
KÉZIRATI TÁR NYELVTUDOMÁNYI
1912. ÉV 12. SZ

$$\begin{aligned}
 X^1 &= \left(\frac{\sqrt{13}}{r^3} \sin d - \frac{\sqrt{8}}{r^3} \cos d \right) \sin \varphi - \frac{\sqrt{2}}{r^3} \cos \varphi \\
 &- 3 \frac{\sqrt{2}}{r^4} a_0 \sin 2\varphi - \left(3 \frac{\sqrt{13}}{r^4} a_0 \sin d - 3 \frac{\sqrt{8}}{r^4} a_0 \cos d \right) \cos 2\varphi \\
 &+ \left(3 \frac{\sqrt{13}}{r^4} b_0 \sin d - 3 \frac{\sqrt{8}}{r^4} b_0 \cos d \right) \sin 2\varphi - 3 \frac{\sqrt{2}}{r^4} b_0 \sin d \cos 2\varphi \\
 &- \left(3 \frac{\sqrt{13}}{r^4} c_0 \sin d - 3 \frac{\sqrt{8}}{r^4} c_0 \cos d \right) \sin 2\varphi + 3 \frac{\sqrt{2}}{r^4} c_0 \cos d \cos 2\varphi.
 \end{aligned}$$

$$\begin{aligned}
 &\left(-\frac{33}{2} \frac{\sqrt{13}}{r^5} A^2 \sin d + \frac{33}{2} \frac{\sqrt{8}}{r^5} A^2 \cos d \right) \sin \varphi - 18 \frac{\sqrt{2}}{r^5} A^2 \cos \varphi \\
 &+ \left(\frac{45}{2} \frac{\sqrt{13}}{r^5} A^2 \sin d - \frac{45}{2} \frac{\sqrt{8}}{r^5} A^2 \cos d \right) \sin^2 \varphi + \frac{45}{2} \frac{\sqrt{2}}{r^5} A^2 \cos^2 \varphi
 \end{aligned}$$

$$+ \left(\frac{3}{2} \frac{\sqrt{8}}{r^5} B^2 \cos d - \frac{9}{2} \frac{\sqrt{13}}{r^5} B^2 \sin d - \frac{45}{2} \frac{\sqrt{8}}{r^5} B^2 \sin d \cos d + \frac{45}{2} \frac{\sqrt{13}}{r^5} B^2 \sin^2 d \right) \sin \varphi$$

$$\begin{aligned}
 &\left(+\frac{3}{2} \frac{\sqrt{2}}{r^5} B^2 + 15 \frac{\sqrt{2}}{r^5} B^2 \sin^2 d \right) \cos \varphi + \left(-\frac{45}{2} \frac{\sqrt{13}}{r^5} B^2 \sin^2 d + \frac{45}{2} \frac{\sqrt{8}}{r^5} B^2 \sin d \cos d \right) \sin^2 \varphi \\
 &- \frac{45}{2} \frac{\sqrt{2}}{r^5} B^2 \sin^2 d \cos^2 \varphi
 \end{aligned}$$

$$+ \left(-\frac{3}{2} \frac{\sqrt{13}}{r^5} C^2 \sin d + \frac{45}{2} \frac{\sqrt{13}}{r^5} C^2 \cos^2 d \sin d + \frac{9}{2} \frac{\sqrt{8}}{r^5} C^2 \cos d - \frac{45}{2} \frac{\sqrt{8}}{r^5} C^2 \cos^2 d \right) \sin \varphi$$

$$\begin{aligned}
 &+ \left(\frac{3}{2} \frac{\sqrt{2}}{r^5} C^2 + 15 \frac{\sqrt{2}}{r^5} C^2 \cos^2 d \right) \cos \varphi + \left(-\frac{45}{2} \frac{\sqrt{13}}{r^5} C^2 \cos^2 d \sin d + \frac{45}{2} \frac{\sqrt{8}}{r^5} C^2 \cos^3 d \right) \sin^2 \varphi \\
 &- \frac{45}{2} \frac{\sqrt{2}}{r^5} C^2 \cos^2 d \cos^2 \varphi.
 \end{aligned}$$

$$-33 \frac{\sqrt{2}}{r^5} AD \sin d \sin \varphi + \left(33 \frac{\sqrt{13}}{r^5} AD \sin d + 3 \frac{\sqrt{13}}{r^5} AB \cos^2 d - 15 \frac{\sqrt{8}}{r^5} AD \sin d \right) \cos \varphi$$

$$+ 45 \frac{\sqrt{2}}{r^5} AD \sin d \sin^2 \varphi + \left(-45 \frac{\sqrt{13}}{r^5} AD \sin d + \frac{45}{2} \frac{\sqrt{8}}{r^5} AD \sin d \right) \cos^2 \varphi$$

$$+ \left(-\frac{39}{2} \frac{\sqrt{13}}{r^5} BC \sin d \sin d + \frac{6}{2} \frac{\sqrt{13}}{r^5} B C \cos^2 d \cos d + \frac{39}{2} \frac{\sqrt{8}}{r^5} B C \sin d \cos d + \frac{6}{2} \frac{\sqrt{8}}{r^5} B C \cos^2 d \right) \sin \varphi$$

$$-15 \frac{\sqrt{2}}{r^5} B C \sin d \cos \varphi + \left(\frac{45}{2} \frac{\sqrt{13}}{r^5} B C \cos^2 d \sin d - \frac{45}{2} \frac{\sqrt{8}}{r^5} B C \cos^2 d \cos d \right) \sin^2 \varphi +$$

$$+ 33 \frac{\sqrt{2}}{r^5} AC \cos d \sin \varphi + \frac{45}{2} \frac{\sqrt{8}}{r^5} B C \sin d \cos^2 \varphi$$

$$+ \left(3 \frac{\sqrt{8}}{r^5} AC + 30 \frac{\sqrt{8}}{r^5} AC \cos^2 d - 15 \frac{\sqrt{13}}{r^5} AC \sin d \right) \cos \varphi -$$

$$-45 \frac{\sqrt{2}}{r^5} AC \cos d \sin^2 \varphi + \left(\frac{45}{2} \frac{\sqrt{13}}{r^5} AC \sin d - 45 \frac{\sqrt{8}}{r^5} AC \cos^2 d \right) \cos^2 \varphi$$

λ second order.

$$\begin{aligned}
 X = & -\frac{\sqrt{\alpha}}{r^3} \cos \varphi + \left(\frac{\sqrt{\beta}}{r^3} \sin \varphi \sin \lambda - \frac{\sqrt{\gamma}}{r^3} \sin \varphi \cos \lambda \right. \\
 & - 3 \frac{\sqrt{\alpha}}{r^4} a_0 \sin 2\varphi - 3 \frac{\sqrt{\beta}}{r^4} a_0 \cos 2\varphi \sin \lambda + 3 \frac{\sqrt{\gamma}}{r^4} a_0 \cos 2\varphi \cos \lambda \\
 & - 3 \frac{\sqrt{\alpha}}{r^4} b_0 \cos 2\varphi \sin \lambda - \frac{3}{2} \frac{\sqrt{\gamma}}{r^4} b_0 \sin 2\varphi \sin \lambda + 3 \frac{\sqrt{\beta}}{r^4} b_0 \sin 2\varphi \cos \lambda \\
 & \left. + 3 \frac{\sqrt{\alpha}}{r^4} c_0 \cos 2\varphi \cos \lambda - \frac{3}{2} \frac{\sqrt{\beta}}{r^4} c_0 \sin 2\varphi \sin \lambda + 3 \frac{\sqrt{\gamma}}{r^4} c_0 \sin 2\varphi \cos \lambda \right) \\
 & + \frac{9}{2} \frac{\sqrt{\alpha}}{r^5} A^2 \cos \varphi - \frac{45}{2} \frac{\sqrt{\alpha}}{r^5} A^2 \sin^2 \varphi \cos \varphi + \left(-\frac{33}{2} \frac{\sqrt{\beta}}{r^5} A^2 \sin \varphi + \frac{45}{2} \frac{\sqrt{\beta}}{r^5} A^2 \sin^3 \varphi \right) \sin \lambda \\
 & + \left(\frac{33}{2} \frac{\sqrt{\gamma}}{r^5} A^2 \sin \varphi - \frac{45}{2} \frac{\sqrt{\gamma}}{r^5} A^2 \sin^3 \varphi \right) \cos \lambda \\
 & + \frac{3}{2} \frac{\sqrt{\alpha}}{r^5} B^2 \cos \varphi - \frac{9}{2} \frac{\sqrt{\beta}}{r^5} B^2 \sin \varphi \sin \lambda + \left(\frac{3}{2} \frac{\sqrt{\gamma}}{r^5} B^2 \sin \varphi - \frac{45}{2} \frac{\sqrt{\gamma}}{r^5} B^2 \cos^2 \varphi \sin \varphi \right) \cos \lambda \\
 & + \left(+15 \frac{\sqrt{\alpha}}{r^5} B^2 \cos \varphi - \frac{45}{2} \frac{\sqrt{\alpha}}{r^5} B^2 \cos^3 \varphi \right) \sin \lambda + \frac{45}{2} \frac{\sqrt{\beta}}{r^5} B^2 \sin \varphi \cos^2 \varphi \sin \lambda \\
 & + \frac{45}{2} \frac{\sqrt{\gamma}}{r^5} B^2 \sin \varphi \cos^2 \varphi \cos \lambda \\
 & + \frac{3}{2} \frac{\sqrt{\alpha}}{r^5} C^2 \cos \varphi + \left(-\frac{3}{2} \frac{\sqrt{\beta}}{r^5} C^2 \sin \varphi + \frac{45}{2} \frac{\sqrt{\beta}}{r^5} C^2 \sin \varphi \cos^2 \varphi \right) \sin \lambda + \frac{3}{2} \frac{\sqrt{\gamma}}{r^5} C^2 \sin \varphi \cos \lambda \\
 & + \left(-\frac{45}{2} \frac{\sqrt{\alpha}}{r^5} C^2 \cos^3 \varphi + 15 \frac{\sqrt{\alpha}}{r^5} C^2 \cos \varphi \right) \sin \lambda - \frac{45}{2} \frac{\sqrt{\beta}}{r^5} C^2 \cos^2 \varphi \sin \varphi \sin^3 \lambda \\
 & - \frac{45}{2} \frac{\sqrt{\gamma}}{r^5} C^2 \cos^2 \varphi \sin \varphi \cos^3 \lambda \\
 & - \left(\frac{21}{2} \frac{\sqrt{\alpha}}{r^5} AB \sin 2\varphi \cos \varphi + 12 \frac{\sqrt{\alpha}}{r^5} AB \sin \varphi \cos 2\varphi \right) \sin \lambda + \\
 & + \left(-\frac{21}{4} \frac{\sqrt{\gamma}}{r^5} AB \sin \varphi \sin 2\varphi + \frac{3}{2} \frac{\sqrt{\gamma}}{r^5} AB \cos \varphi + 6 \frac{\sqrt{\gamma}}{r^5} AB \cos \varphi \cos 2\varphi \right) \sin \lambda \\
 & + \left(+\frac{21}{2} \frac{\sqrt{\beta}}{r^5} AB \sin \varphi \sin 2\varphi - 12 \frac{\sqrt{\beta}}{r^5} AB \cos \varphi \cos 2\varphi \right) \sin \lambda + 3 \frac{\sqrt{\beta}}{r^5} AB \cos \varphi \cos^2 \lambda \\
 & + \left(21 \frac{\sqrt{\gamma}}{r^5} BC \sin \varphi \cos^2 \varphi - 3 \frac{\sqrt{\gamma}}{r^5} BC \sin \varphi + 12 \frac{\sqrt{\gamma}}{r^5} BC \cos \varphi \sin 2\varphi \right) \sin \lambda \\
 & + \left(-21 \frac{\sqrt{\beta}}{r^5} BC \cos^2 \varphi \sin \varphi + 3 \frac{\sqrt{\beta}}{r^5} BC \sin \varphi - 12 \frac{\sqrt{\beta}}{r^5} BC \sin 2\varphi \cos \varphi \right) \cos \lambda \\
 & + \left(-15 \frac{\sqrt{\alpha}}{r^5} BC \cos \varphi + \frac{45}{2} \frac{\sqrt{\alpha}}{r^5} BC \cos^3 \varphi \right) \sin \lambda - \left(\frac{21}{r^5} BC \sin \varphi \cos^2 \varphi + 12 \frac{\sqrt{\beta}}{r^5} BC \cos \varphi \sin \varphi \right) \sin^3 \lambda \\
 & + \left(21 \frac{\sqrt{\beta}}{r^5} BC \cos^2 \varphi \sin \varphi + 12 \frac{\sqrt{\beta}}{r^5} BC \sin 2\varphi \cos \varphi \right) \cos^3 \lambda + \dots
 \end{aligned}$$

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$$\begin{aligned}
& + \left(\frac{21}{2} \frac{\sqrt{a}}{r^5} AC \sin \varphi \cos \varphi + 12 \frac{\sqrt{a}}{r^5} AC \sin \varphi \cos 2\varphi \right) \cos \lambda + \\
& + \left(-\frac{21}{4} \frac{\sqrt{b}}{r^5} AC \sin \varphi \sin 2\varphi + \frac{3}{2} \frac{\sqrt{b}}{r^5} AC \cos \varphi + 6 \frac{\sqrt{b}}{r^5} AC \cos \varphi \cos 2\varphi \right) \sin \lambda \\
& + 3 \frac{\sqrt{c}}{r^5} AC \cos \varphi \sin \lambda + \left(\frac{21}{2} \frac{\sqrt{c}}{r^5} AC \sin \varphi \sin 2\varphi - 12 \frac{\sqrt{c}}{r^5} AC \cos \varphi \cos 2\varphi \right) \cos \lambda.
\end{aligned}$$

1. Ansatz.

$$\begin{aligned} X = & -\frac{V_d}{r^2} \cos \varphi + \frac{V_B}{r^3} \sin \varphi \sin d - \frac{V_X}{r^3} \sin \varphi \cos d \\ & - 3 \frac{V_d}{r^4} a_0 \sin 2\varphi - 3 \frac{V_B}{r^4} a_0 \cos 2\varphi \sin d + 3 \frac{V_X}{r^4} a_0 \cos 2\varphi \cos d \\ & - 3 \frac{V_d}{r^4} b_0 \cos 2\varphi \sin d - \frac{3}{2} \frac{V_X}{r^4} b_0 \sin 2\varphi \sin d + 3 \frac{V_B}{r^4} b_0 \sin 2\varphi \cos d \\ & + 3 \frac{V_d}{r^4} c_0 \cos 2\varphi \cos d - \frac{3}{2} \frac{V_B}{r^4} c_0 \sin 2\varphi \sin d + 3 \frac{V_X}{r^4} c_0 \sin 2\varphi \cos d \\ & + \frac{9}{2} \frac{V_d}{r^5} A^2 \cos \varphi - \frac{45}{2} \frac{V_d}{r^5} A^2 \sin^2 \varphi \cos \varphi + \left(-\frac{33}{2} \frac{V_B}{r^5} A^2 \sin \varphi + \frac{45}{2} \frac{V_B}{r^5} A^2 \sin^3 \varphi \right) \sin d \\ & + \left(\frac{33}{2} \frac{V_X}{r^5} A^2 \sin \varphi - \frac{45}{2} \frac{V_X}{r^5} A^2 \sin^3 \varphi \right) \cos d \\ & + \frac{9}{2} \frac{V_d}{r^5} B^2 \cos \varphi - \frac{9}{2} \frac{V_B}{r^5} B^2 \sin \varphi \sin d + \left(-21 \frac{V_X}{r^5} B^2 \sin \varphi + \frac{45}{2} \frac{V_X}{r^5} B^2 \sin^3 \varphi \right) \cos d \\ & + \left(15 \frac{V_d}{r^5} B^2 \cos \varphi - \frac{45}{2} \frac{V_d}{r^5} B^2 \cos^3 \varphi \right) \sin d + \left(\frac{45}{2} \frac{V_B}{r^5} B^2 \sin \varphi - \frac{45}{2} \frac{V_B}{r^5} B^2 \sin^3 \varphi \right) \sin d \\ & + \left(\frac{45}{2} \frac{V_X}{r^5} B^2 \sin \varphi - \frac{45}{2} \frac{V_X}{r^5} B^2 \sin^3 \varphi \right) \cos d \\ & + \frac{9}{2} \frac{V_d}{r^5} C^2 \cos \varphi + \left(21 \frac{V_B}{r^5} C^2 \sin \varphi - \frac{45}{2} \frac{V_B}{r^5} C^2 \sin^3 \varphi \right) \sin d + \frac{9}{2} \frac{V_X}{r^5} C^2 \sin \varphi \cos d \\ & + \left(-\frac{45}{2} \frac{V_d}{r^5} C^2 \cos^3 \varphi + 15 \frac{V_d}{r^5} C^2 \cos \varphi \right) \cos d + \left(-\frac{45}{2} \frac{V_B}{r^5} C^2 \sin \varphi + \frac{45}{2} \frac{V_B}{r^5} C^2 \sin^3 \varphi \right) \sin d \\ & + \left(-\frac{45}{2} \frac{V_X}{r^5} C^2 \sin \varphi + \frac{45}{2} \frac{V_X}{r^5} C^2 \sin^3 \varphi \right) \cos d \\ & - \left(33 \frac{V_d}{r^5} AB \sin \varphi - 45 \frac{V_d}{r^5} AB \sin^3 \varphi \right) \sin d + \left(-15 \frac{V_X}{r^5} AB \cos \varphi + \frac{45}{2} \frac{V_X}{r^5} AB \cos^3 \varphi \right) \sin d \\ & + \left(33 \frac{V_B}{r^5} AB \cos \varphi - 45 \frac{V_B}{r^5} AB \cos^3 \varphi \right) \sin d + 3 \frac{V_B}{r^5} AB \cos \varphi \cos d + \\ & + \left(42 \frac{V_X}{r^5} BC \sin \varphi - 45 \frac{V_X}{r^5} BC \sin^3 \varphi \right) \sin d + \left(-42 \frac{V_B}{r^5} BC \sin \varphi + 45 \frac{V_B}{r^5} BC \sin^3 \varphi \right) \cos d \\ & + \left(-15 \frac{V_d}{r^5} BC \cos \varphi + \frac{45}{2} \frac{V_d}{r^5} BC \cos^3 \varphi \right) \sin d + \left(-45 \frac{V_X}{r^5} BC \sin \varphi + 45 \frac{V_X}{r^5} BC \sin^3 \varphi \right) \sin d \\ & + \left(+45 \frac{V_B}{r^5} BC \sin \varphi - 45 \frac{V_B}{r^5} BC \sin^3 \varphi \right) \cos d \\ & + \left(33 \frac{V_d}{r^5} AC \sin \varphi - 45 \frac{V_d}{r^5} AC \sin^3 \varphi \right) \cos d \\ & + \left(-15 \frac{V_B}{r^5} AC \cos \varphi + \frac{45}{2} \frac{V_B}{r^5} AC \cos^3 \varphi \right) \sin d + 3 \frac{V_X}{r^5} AC \cos \varphi \sin d \\ & + \left(33 \frac{V_X}{r^5} AC \cos \varphi - 45 \frac{V_X}{r^5} AC \cos^3 \varphi \right) \cos d \end{aligned}$$

$$Z = -2m_a \sin \varphi - 2m_b \cos \varphi \sin \alpha + 2m_c \cos \varphi \cos \alpha$$

$$-(2h+i)(1 - \frac{3}{2} \cos^2 \varphi)$$

$$-\frac{3}{2} e \sin 2\varphi \sin \alpha + \frac{3}{2} g \sin 2\varphi \cos \alpha + \frac{2}{2} f \cos^2 \varphi \sin 2\alpha + \frac{3}{2} i \cos^2 \varphi \cos 2\alpha$$

$$+(2E+H)(6 \sin \varphi - 10 \sin^3 \varphi)$$

$$+(4J+3F)(4 \cos \varphi - 5 \cos^3 \varphi) \sin \alpha$$

$$+(4K+3G)(4 \cos \varphi - 5 \cos^3 \varphi) \cos \alpha$$

$$+20L(\sin \varphi - \sin^3 \varphi) \sin 2\alpha$$

$$+10M(\sin \varphi - \sin^3 \varphi) \cos 2\alpha$$

$$+5F \cos^2 \varphi \sin \alpha (3 - 4 \sin^2 \alpha)$$

$$+5G \cos^2 \varphi \cos \alpha (3 - 4 \cos^2 \alpha)$$

$$(4 \cos \varphi - 5 \cos^3 \varphi)_{\text{maximum}} = 1,979 \quad \varphi = 21^\circ \text{ hat}$$

$$(\sin \varphi - \sin^3 \varphi)_{\text{maximum}} = 0,385 \quad \varphi = 35^\circ 10' \text{ hat}$$

$$\sin \alpha (3 - 4 \sin^2 \alpha)_{\text{max}} = 1 \quad \alpha = 36^\circ \text{ hat}$$

$$\cos \alpha (3 - 4 \cos^2 \alpha)_{\text{max}} = 1 \quad \alpha = 60^\circ \text{ hat}$$

$$\frac{1}{18} \sum (X - X') \sin^2 \lambda = \frac{3}{4} M_6 \sin \varphi + J \left(\frac{66}{8} \sin \varphi - \frac{20}{8} \sin^3 \varphi \right) + F \left(\frac{57}{8} \sin \varphi - \frac{75}{8} \sin^3 \varphi \right)$$

$$\frac{1}{18} \sum (Y + Y') \cos^2 \lambda = -\frac{3}{4} M_6 + J \left(\frac{12}{4} - \frac{15}{4} \cos^2 \varphi \right) + F \left(\frac{9}{4} - \frac{15}{8} \cos^2 \varphi \right)$$

$$\frac{1}{18} \sum (Z + Z') \sin^2 \lambda = -\frac{3}{2} M_6 \cos \varphi + J (12 \cos \varphi - 15 \cos^3 \varphi) + F (9 \cos \varphi - \frac{25}{2} \cos^3 \varphi)$$

$$\frac{1}{18} \sum (X - X') \sin^2 \lambda = \frac{3}{4} M_6 \sin \varphi + \left[(-8 + 30 \cos^2 \varphi) J + (-6 + 25 \cos^2 \varphi) F \right] \frac{3}{8} \sin \varphi$$

$$= \frac{3}{4} M_6 \sin \varphi$$

$$1) \frac{1}{18} \sum (X - X') \sin^3 \lambda = +\frac{3}{4} M_6 \sin \varphi - \frac{3}{4} (4J + 3F) \sin \varphi + \frac{45}{16} (4J + 3F) \cos^2 \varphi \sin \varphi + \frac{15}{16} F \cos^4 \varphi \sin \varphi$$

$$2) \frac{1}{18} \sum (Y + Y') \cos^3 \lambda = -\frac{3}{4} M_6 + \frac{3}{4} (4J + 3F) - \frac{15}{16} (4J + 3F) \cos^2 \varphi + \frac{15}{16} F \cos^4 \varphi$$

$$3) \frac{1}{18} \sum (Z + Z') \sin^2 \lambda = -\frac{3}{2} M_6 \cos \varphi + 3(4J + 3F) \cos \varphi - \frac{15}{4} (4J + 3F) \cos^3 \varphi - \frac{5}{4} F \cos^5 \varphi$$

$$4) \frac{1}{18} \sum (X - X') \cos^2 \lambda = -\frac{3}{4} M_6 \cos \varphi + \frac{3}{4} (4K + 3S) \cos \varphi + \frac{45}{16} (4K + 3S) \cos^3 \varphi \cos \varphi + \frac{15}{16} S \cos^5 \varphi \cos \varphi$$

$$5) \frac{1}{18} \sum (Y + Y') \sin^3 \lambda = -\frac{3}{4} M_6 - \frac{3}{4} (4K + 3S) + \frac{15}{16} (4K + 3S) \cos^2 \varphi - \frac{15}{16} S \cos^4 \varphi$$

$$6) \frac{1}{18} \sum (Z + Z') \cos^2 \lambda = +\frac{3}{2} M_6 \cos \varphi + 3(4K + 3S) \cos \varphi - \frac{15}{4} (4K + 3S) \cos^3 \varphi - \frac{5}{4} S \cos^5 \varphi$$

2 és 5-ös:

$$4 \cos \varphi \frac{1}{18} \sum (Y + Y') \cos^2 \lambda - \frac{1}{18} \sum (Z + Z') \sin^2 \lambda = -\frac{3}{2} M_6 \cos \varphi + 5F \cos^3 \varphi$$

5 és 6-ös: $4 \cos \varphi \frac{1}{18} \sum (Y + Y') \sin^2 \lambda + \frac{1}{18} \sum (Z + Z') \cos^2 \lambda = -\frac{3}{2} M_6 \cos \varphi - 5S \cos^3 \varphi$

$$X' = -\mu_a \cos \varphi + \mu_b \sin \varphi \sin d - \mu_c \sin \varphi \cos d \\ - \frac{1}{2}(2h+i) \sin 2\varphi$$

$$= e \cos 2\varphi \sin d + g \cos 2\varphi \cos d - \frac{1}{2}f \sin 2\varphi \sin d - \frac{1}{2}i \sin 2\varphi \cos d \\ - (2E+H)(6 \cos \varphi - \frac{15}{2} \cos^3 \varphi) \\ + \frac{1}{4}(4J+3F)(11 \sin \varphi - 15 \sin^3 \varphi) \sin d \\ + \frac{1}{4}(4K+3S)(11 \sin \varphi - 15 \sin^3 \varphi) \cos d \\ - 10L(\cos \varphi - \frac{3}{2} \cos^3 \varphi) \sin 2d \\ - 5H(\cos \varphi - \frac{3}{2} \cos^3 \varphi) \cos 2d \\ - \frac{15}{4}F(\sin \varphi - \sin^3 \varphi)(3-4 \sin^2 d) \sin d \\ - \frac{15}{4}S(\sin \varphi - \sin^3 \varphi)(3-4 \cos^2 d) \cos d$$

$$Y = -\mu_a \sin d - \mu_b \cos d$$

$$= g \sin \varphi \sin d - e \sin \varphi \cos d - i \cos \varphi \sin d + f \cos \varphi \cos d \\ - (4K+3S)(1 - \frac{5}{4} \cos^2 \varphi) \sin d \\ + (4J+3F)(1 - \frac{5}{4} \cos^2 \varphi) \cos d \\ - \frac{5}{2}H \sin 2\varphi \sin d \\ - 5L \sin \varphi \cos d \\ + \frac{15}{4}S \cos^2 \varphi (3-4 \sin^2 d) \sin d \\ - \frac{15}{4}F \cos^2 \varphi (3-4 \cos^2 d) \cos d$$

$$4K + 2S = y \quad \frac{1}{18} \sum (X - X') \cos^2 \lambda = X$$

$$\frac{1}{18} \sum (Y + Y') \sin^2 \lambda = Y$$

$$\frac{1}{18} \sum (Z + Z') \cos^2 \lambda = Z$$

$$X = -\frac{3}{4} \sin \varphi C - \frac{3}{4} \sin \varphi \left(1 - \frac{15}{4} \cos^2 \varphi\right) y + \frac{3}{16} \sin \varphi \left(-\frac{3}{2} \cos \varphi \cdot C - Z - 4 \cos \varphi Y\right)$$

$$Z = +\frac{3}{2} \cos \varphi C + \left(3 \cos \varphi - \frac{15}{4} \cos^3 \varphi\right) y + \frac{3}{8} \cos \varphi C + \cos \varphi Y + \frac{1}{4} Z$$

$$\frac{4X}{\sin \varphi} = -\frac{33}{8} C - 3 \left(1 - \frac{15}{4} \cos^2 \varphi\right) y - \frac{3}{4} \frac{Z}{\cos \varphi} - 3Y$$

$$\frac{Z}{\cos \varphi} = +\frac{15}{8} C + 3 \left(1 - \frac{5}{4} \cos^2 \varphi\right) y + \frac{1}{4} \frac{Z}{\cos \varphi} + Y$$

$$\frac{60X}{\sin \varphi} = -15 \frac{33}{8} C - 45 \left(1 - \frac{15}{4} \cos^2 \varphi\right) y - \frac{45}{4} \frac{Z}{\cos \varphi} = 45 - Y$$

$$\frac{33Z}{\cos \varphi} = +33 \frac{15}{8} C + 99 \left(1 - \frac{5}{4} \cos^2 \varphi\right) y + \frac{33}{4} \frac{Z}{\cos \varphi} + 33Y$$

$$\frac{60X}{\sin \varphi} + \frac{33Z}{\cos \varphi} = + (44 + 45 \cos^2 \varphi) y - 3 \frac{Z}{\cos \varphi} - 12Y$$

$$y = \frac{\frac{60X}{\sin \varphi} + \frac{33Z}{\cos \varphi} + 12Y}{54 + 45 \cos^2 \varphi} = \frac{\frac{10}{3} \frac{X}{\sin \varphi} + 2 \frac{Z}{\cos \varphi} + \frac{2}{3} Y}{44 + 45 \cos^2 \varphi}$$

$$y = \frac{\frac{10}{3} \frac{X}{\sin \varphi} + 2 \frac{Z}{\cos \varphi} + \frac{2}{3} Y}{54 + 45 \cos^2 \varphi} \quad y = \frac{1}{18} \frac{5 \frac{X}{\sin \varphi} + 3 \frac{Z}{\cos \varphi} + Y}{18 + 15 \cos^2 \varphi}$$

$$\frac{5}{2} C = \frac{Z}{\cos \varphi} - \frac{4}{3} Y = (4 - 5 \cos^2 \varphi) y$$

$$\xi(x-x') \sin^2 \lambda = \xi$$

$$\xi(y+y') \cos^2 \lambda = \eta$$

$$\xi(z+z') \sin^2 \lambda = \xi$$

$$4J + 2F = y$$

$$\frac{1}{18} \xi = +\frac{3}{4} b \sin \varphi - \frac{3}{4} \sin \varphi \left(1 - \frac{15}{4} \cos^2 \varphi\right) y + \frac{3}{16} \eta \left(+\frac{3}{2} b \cos \varphi + 4 \cos \varphi \frac{1}{18} \eta - \frac{1}{18} \xi\right)$$

$$\frac{1}{18} \xi = -\frac{3}{2} b \cos \varphi + 3 \cos \varphi \left(1 - \frac{5}{4} \cos^2 \varphi\right) y - \frac{1}{4} \left(+\frac{3}{2} b \cos \varphi + 4 \cos \varphi \frac{1}{18} \eta - \frac{1}{18} \xi\right)$$

$$\frac{1}{18} \cdot \frac{4}{3} \frac{\xi}{\sin \varphi} = +\frac{11}{8} b - \left(1 - \frac{15}{4} \cos^2 \varphi\right) y + \frac{1}{18} \eta - \frac{1}{4} \frac{1}{18} \frac{\xi}{\cos \varphi}$$

$$\frac{1}{18} \frac{\xi}{\cos \varphi} = -\frac{15}{8} b + 3 \left(1 - \frac{5}{4} \cos^2 \varphi\right) y - \frac{1}{18} \eta + \frac{1}{4} \frac{1}{18} \frac{\xi}{\sin \varphi}$$

$$20 \frac{1}{18} \frac{\xi}{\sin \varphi} = + \quad -15 \left(1 - \frac{15}{4} \cos^2 \varphi\right) y + 15 \frac{1}{18} \eta - \frac{15}{4} \frac{1}{18} \frac{\xi}{\cos \varphi}$$

$$11 \frac{1}{18} \frac{\xi}{\cos \varphi} = - \quad +32 \left(1 - \frac{5}{4} \cos^2 \varphi\right) y - 11 \frac{1}{18} \eta + \frac{11}{4} \frac{1}{18} \frac{\xi}{\sin \varphi}$$

$$20 \frac{1}{18} \frac{\xi}{\sin \varphi} + 12 \frac{1}{18} \frac{\xi}{\cos \varphi} - 4 \frac{1}{18} \eta = + (18 + 15 \cos^2 \varphi) y$$

$$y = \frac{1}{18} \cdot 4 \cdot \frac{\frac{\xi}{5 \sin \varphi} + \frac{\xi}{3 \cos \varphi} - \eta}{18 + 15 \cos^2 \varphi} = \frac{\frac{10}{3} \frac{\xi}{\sin \varphi} + 2 \frac{\xi}{\cos \varphi} - \frac{2}{3} \eta}{54 + 45 \cos^2 \varphi}$$

$$+\frac{5}{2} b = (4 - 5 \cos^2 \varphi) y - \frac{1}{18} \left(\frac{\xi}{\cos \varphi} + \frac{4}{3} \eta\right)$$

μ_a, μ_b, μ_c korlátos értékű φ és φ értékeinek a Z, F, S és \dots számításokhoz.

$\sum y_{mid}$ és $\sum y_{ord}$
 $\sum y_{mid}$ az $\sum y_{ord}$

(I)

φ	μ_a	$2E+H$	μ_b	$4J+2F$	μ_c	$4K+2S$
0			+58,10	+0,71	+2,62	-8,37
20	-317,45	+7,86	+63,34	-1,71	+19,04	-0,62
40	-312,84	+7,84	+58,13	-0,06	+41,95	+7,10
60	-311,42	+5,99	+49,39	+8,40*	+37,13	-17,46*
	941,71		228,96	0	101,34	0
	$\mu_a = -3,13,9$		$\mu_b = 57,24$		$\mu_c = 25,34$	

φ	$\sum (y-y_{mid})$	$\sum (2-y)$	$\sum (2-y)_{ord}$	$\sum (2-y)_{mid}$	$\sum (X-x)_{mid}$	$\sum (X-x)_{ord}$
	L	L	L	L	L	L
0					-0,53	-6,97
20	-7,21	-9,39	+0,29	+0,16	0,00	-12,04
40	-11,95	-11,75	-0,16	+0,00	-0,54	-9,65
60	-15,22	-16,71	+0,46	+2,67	-0,54	-10,28

φ	$\sum (X-x)_{mid}$	$\sum (X-x)_{ord}$	μ_b	$4J+2F$	μ_c	$4K+2S$
0						
20						
40						
60						

$\sum (X-x)_{mid} = -\sum \varphi \sum y_{ord}$

$\sum (X-x)_{ord} = +\sum \varphi \sum y_{mid}$

Kérem, hogy a táblázat nem igazolom

$\sum (X-X') \sin^2 \alpha$ és $\sum Z \sin^2 \alpha$
 $\sum (X-X') \cos^2 \alpha$ és $\sum Z \cos^2 \alpha$

φ	m_6	$4J+3F$	m_c	$4K+2G$
20	+64,09	-4,26	+27,39	+29,40
40	+63,12	+8,11	+31,07	+27,52
60	+77,34	+30,07	+28,77	+23,86
	$\frac{204,55}{3} = 68,18$		$\frac{87,23}{3} = 29,08$	

$\sum (y+y') \sin^2 \alpha$ és $\sum (Z+Z') \sin^2 \alpha$
 $\sum (y+y') \cos^2 \alpha$ és $\sum (Z+Z') \cos^2 \alpha$

m_6 és m_c értékeinek a táblázat I táblázatának $m_6 = 68,18$ és $m_c = 29,08$ értékeivel való összehasonlítása a táblázat I táblázatának $m_6 = 62,71$ és $m_c = 27,21$ értékeivel való összehasonlítása.

φ	F	G	F	G
0	-5,61	+7,65	$m_6=62,71$ -4,23	$m_c=27,21$ +0,28
20	-1,23	+3,86	62,71 -1,42	27,21 +1,09
40	-3,95	-12,82	62,71 -1,60	27,21 -0,89
60	-23,23 ^{$m_6=49$}	-19,22	62,71 -7,23	27,21 -6,75

$\sum (X-X') \cos^2 \alpha$, $\sum (y+y') \sin^2 \alpha$ és $\sum (Z+Z') \cos^2 \alpha$

φ	$4K+3S$	m_0	G
20	+40,06	+26,29	+1,40
40	+28,97	+28,92	-1,75
60	+22,65	+26,46	-5,78

MAGYAR
 TUDOMÁNYOS AKADÉMIA
 KÖNYVTÁRA

$\sum (x-x') \sin^2 \lambda$, $\sum (y+y') \cos^2 \lambda$ is $\sum (z+z') \sin^2 \lambda$ but.

φ	$4J+2F$	μ_6	$F.$
20	-4,21	+64,00	-1,00
40	+7,78	+61,82	-1,89
60	+30,98	+73,64	+5,24

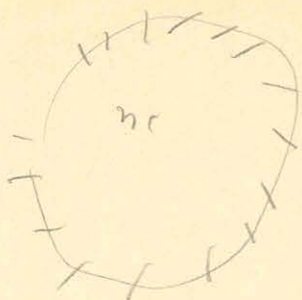
hinunter

28
09
89
75

$$\begin{aligned}
 X &= -\frac{\sqrt{\alpha}}{r^3} \cos \varphi + \frac{\sqrt{\beta}}{r^3} \sin \varphi \sin d - \frac{\sqrt{\gamma}}{r^3} \sin \varphi \cos d \\
 &- 3\frac{\sqrt{\alpha}}{r^4} (\alpha a_0 - \beta b_0) \sin 2\varphi - 3\frac{\sqrt{\gamma}}{r^4} (\beta a_0 + \alpha b_0) \cos 2\varphi \sin d + 3\frac{\sqrt{\gamma}}{r^4} (\gamma a_0 + \alpha c_0) \cos 2\varphi \cos d \\
 &- 3\frac{\sqrt{\gamma}}{r^4} (\gamma b_0 + \beta c_0) \sin 2\varphi \sin d - 3\frac{\sqrt{\gamma}}{r^4} (\beta b_0 - \gamma c_0) \sin 2\varphi \cos d
 \end{aligned}$$

$$\begin{aligned}
 Y &= -\frac{\sqrt{\gamma}}{r^3} \sin d - \frac{\sqrt{\beta}}{r^3} \cos d \\
 &- 3\frac{\sqrt{\gamma}}{r^4} (\gamma a_0 + \alpha c_0) \sin \varphi \sin d - 3\frac{\sqrt{\gamma}}{r^4} (\beta a_0 + \alpha b_0) \sin \varphi \cos d \\
 &- 3\frac{\sqrt{\gamma}}{r^4} (\beta b_0 - \gamma c_0) \cos \varphi \sin d + 3\frac{\sqrt{\gamma}}{r^4} (\gamma b_0 + \beta c_0) \cos \varphi \cos d
 \end{aligned}$$

$$\begin{aligned}
 Z &= -2\frac{\sqrt{\alpha}}{r^3} \sin \varphi - 2\frac{\sqrt{\beta}}{r^3} \cos \varphi \sin d + 2\frac{\sqrt{\gamma}}{r^3} \cos \varphi \cos d \\
 &- 6\frac{\sqrt{\alpha}}{r^4} (\alpha a_0 - \beta b_0) - 3\frac{\sqrt{\gamma}}{r^4} (\beta b_0 - \gamma c_0) + 9\frac{\sqrt{\alpha}}{r^4} (\alpha a_0 - \beta b_0) \cos^2 \varphi \\
 &- \frac{9}{2}\frac{\sqrt{\gamma}}{r^4} (\beta a_0 + \alpha b_0) \sin 2\varphi \sin d + \frac{9}{2}\frac{\sqrt{\gamma}}{r^4} (\gamma a_0 + \alpha c_0) \sin 2\varphi \cos d \\
 &+ \frac{9}{2}\frac{\sqrt{\gamma}}{r^4} (\gamma b_0 + \beta c_0) \cos 2\varphi \sin d + 9\frac{\sqrt{\gamma}}{r^4} (\beta b_0 - \gamma c_0) \cos^2 \varphi \cos d
 \end{aligned}$$



$$\frac{2\pi}{n}$$

$$\sum X$$

$$\sum 1 = n$$

$$\sum \cos d = 0$$

$$\sum \sin d = 0$$

$$\sum \cos^2 d = \frac{n}{2}$$

$$\sum \sin^2 d = \frac{n}{2}$$

$$\sum \cos^2 d \cos d = 0$$

$$\sum_{k=1}^{n-1} \cos^2 k \cdot \frac{2\pi}{n} = \sum_{k=1}^{n-1} \cos^2 d = \frac{3}{8} n$$

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

$$\sum \sin^2 d \cos^2 d = \frac{1}{8} n$$

$$\cos^2 d = \frac{1}{2} + \frac{1}{2} \cos 2d$$

$$\cos^2 d \sin^2 d$$

$$\sum X = n \left\{ -\frac{\mu}{r^2} \sin \varphi_0 \cos \varphi - 3 \frac{\mu l}{r^4} \sin \varphi_0 \cos \varphi \sin 2\varphi \right\} +$$

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

$$\sum X \sin d = \frac{n}{2} \left\{ \frac{\mu}{r^2} \cos \varphi_0 \sin d_0 \sin \varphi - 3 \frac{\mu l}{r^4} \sin \varphi_0 \cos \varphi \sin d_0 \cos 2\varphi - 3 \frac{\mu l}{r^4} \cos \varphi_0 \sin \varphi \sin d_0 \cos \varphi \right\}$$

$$\sum X \cos d = \frac{n}{2} \left\{ \frac{\mu}{r^2} \cos \varphi_0 \cos d_0 \sin \varphi - 3 \frac{\mu l}{r^4} \sin \varphi_0 \cos \varphi \cos d_0 \cos 2\varphi - \frac{3 \mu l}{r^4} \cos \varphi_0 \sin \varphi \cos d_0 \cos \varphi \right\}$$

$$\sum X \sin^2 d = \frac{n}{2} \left\{ -\frac{\mu}{r^2} \sin \varphi_0 \cos \varphi - 3 \frac{\mu l}{r^4} \sin \varphi_0 \cos \varphi \sin 2\varphi \right\}$$

$$+ n \frac{3 \mu l}{8 r^4} \cos \varphi_0 \cos \varphi \cos d_0 \cos d_0 \sin 2\varphi$$

$$\sum 0 = 0$$

$$\sum Y \sin d = \frac{n}{2} \left\{ \right\}$$

$$\sum Y \cos d = -\frac{n}{2} \left\{ \right\}$$

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

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

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

harcosis könyvtár $\frac{\partial^2 u}{\partial x \partial y}, \frac{\partial^2 u}{\partial y^2}, \frac{\partial^2 u}{\partial y \partial z} = 0$ és $\frac{\partial^2 u}{\partial x^2} = -\frac{\partial^2 u}{\partial z^2}$

ha x helyén z és a magasság v helyén V állunk.

$$\Delta N = v \frac{\partial^2 u}{\partial z^2} + \gamma \frac{\partial^2 u}{\partial z \partial z}$$

$$\Delta P = 0$$

$$\Delta Z = v \frac{\partial^2 u}{\partial z^2} - \gamma \frac{\partial^2 u}{\partial z^2}$$

vagyis

$$\gamma \Delta N + v \Delta Z = \gamma \frac{\partial^2 u}{\partial z^2} = (\gamma^2 + v^2) \frac{\partial^2 u}{\partial z^2}$$

$$v \Delta N - \gamma \Delta Z = (v^2 - \gamma^2) \frac{\partial^2 u}{\partial z^2}$$

ha $\frac{\partial^2 u}{\partial z^2} = 0$ akkor.

$$v \Delta N - \gamma \Delta Z = 0$$

és ha τ a magasság határolásának irányvektora

$$v \Delta N \cos \varphi - \gamma \Delta Z = 0 \quad \text{és}$$

$$m_x \Delta X + m_y \Delta y - m_z \Delta Z = 0$$

A fűrészes magasságok esetén.

$$\Delta X (\sin \varphi_\tau \cos \varphi - \sin \varphi \cos \varphi_\tau \sin(\alpha_\tau - \alpha)) + \Delta y \cos \varphi_\tau \sin(\alpha_\tau - \alpha) + \\ + \Delta Z (\cos \varphi_\tau \cos(\alpha_\tau - \alpha) \cos \varphi + \sin \varphi_\tau \sin \varphi) = 0$$

$$\Delta X = kX \frac{\partial^2 u}{\partial x^2} + kY \frac{\partial^2 u}{\partial x \partial y} + kZ \frac{\partial^2 u}{\partial x \partial z}$$

$$\Delta Y = kX \frac{\partial^2 u}{\partial x \partial y} + kY \frac{\partial^2 u}{\partial y^2} + kZ \frac{\partial^2 u}{\partial y \partial z}$$

$$\Delta Z = kX \frac{\partial^2 u}{\partial x \partial z} + kY \frac{\partial^2 u}{\partial y \partial z} + kZ \frac{\partial^2 u}{\partial z^2}$$

Voraussetzung erhalten x heißt n $\frac{\partial^2 u}{\partial x^2}$ $\frac{\partial^2 u}{\partial x \partial y}$ $\frac{\partial^2 u}{\partial y^2}$ $\frac{\partial^2 u}{\partial y \partial z}$ $\frac{\partial^2 u}{\partial z^2} = 0$
is

$$\Delta N = kN \frac{\partial^2 u}{\partial n^2} + kZ \frac{\partial^2 u}{\partial n \partial z}$$

$$\Delta Y = 0$$

$$\Delta Z = kN \frac{\partial^2 u}{\partial n \partial z} + kZ \frac{\partial^2 u}{\partial z^2}$$

$$\text{also } \frac{\partial^2 u}{\partial z^2} = -\frac{\partial^2 u}{\partial n^2}$$

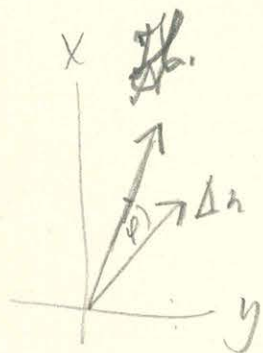
Setzt

$$Z \Delta N + N \Delta Z = k(Z^2 + N^2) \frac{\partial^2 u}{\partial n \partial z}$$

$$N \Delta N - Z \Delta Z = k(Z^2 + N^2) \frac{\partial^2 u}{\partial z^2}$$

a hat $\frac{\partial^2 u}{\partial z^2} = 0$ a hätte von oben also

$$\underline{N \Delta N - Z \Delta Z = 0}$$



$$N = H \cos \varphi$$

$$N \Delta N = H \Delta N \cos \varphi$$

$$= H \Delta N \cos \alpha \cos \varphi + H \Delta N \sin \alpha \sin \varphi$$

$$= X \Delta X + Y \Delta Y \quad \text{is } \varphi$$

a hat $\frac{\partial^2 u}{\partial z^2} = 0$ also

$$\underline{X \Delta X + Y \Delta Y - Z \Delta Z = 0}$$

Primer speciál normális értékekre.

$$a = -0,31657$$

$$b = +0,05955$$

$$c = +0,02345$$

$$X'_n = -a \cos \varphi + b \sin \varphi \cos d - c \sin \varphi \cos d$$

$$Y'_n = -b \cos d - c \sin d$$

$$\frac{\partial X'_n}{\partial \varphi} = \frac{\partial X'_n}{\partial \varphi} + \frac{X'_n}{r} = 3 \frac{X'_n}{r} + \left(\frac{\partial X'_n}{\partial \varphi} + \frac{X'_n}{r} \right) r$$

$$\frac{\partial Y'_n}{\partial \varphi} = \frac{\partial Y'_n}{\partial \varphi} + \frac{Y'_n}{r} = 3 \frac{Y'_n}{r} + \left(\frac{\partial Y'_n}{\partial \varphi} + \frac{Y'_n}{r} \right) r$$

$$\frac{\partial Z'_n}{\partial \varphi} = \frac{\partial Z'_n}{\partial \varphi} + \frac{Z'_n}{r} = 3 \frac{Z'_n}{r} + \left(\frac{\partial Z'_n}{\partial \varphi} + \frac{Z'_n}{r} \right) r$$

$$\varphi = 45^\circ, \quad \frac{X_n}{r} = -\frac{a}{r} \cos \varphi + \frac{b \sin \varphi}{r} \cos \lambda - \frac{c \sin \varphi}{r} \sin \lambda = +0,35755 + 0,06613 \cos \lambda - 0,02604 \sin \lambda$$

$$\frac{Y_n}{r} = -\frac{b}{r} \cos \lambda - \frac{c}{r} \sin \lambda = -0,09352 \cos \lambda - 0,03683 \sin \lambda$$

$$\frac{Z_n}{r} = -2\frac{a}{r} \sin \varphi - 2\frac{b}{r} \cos \varphi \sin \lambda + 2\frac{c \sin \varphi}{r} \cos \lambda = +0,70310 - 0,13226 \sin \lambda + 0,05208 \cos \lambda$$

λ	$+0,06613$ $\times \cos \lambda$	$-0,02604$ $\cdot \sin \lambda$	$\frac{X_n}{r}$	$-0,09352$ $\cos \lambda$	$-0,03683$ $\sin \lambda$	$\frac{Y_n}{r}$		$\frac{Z_n}{r}$	$\frac{22}{7} - 3\frac{X_n}{r}$	$\frac{22}{7} - 3\frac{Y_n}{r}$
0	+0,3516	0	-0,0260	+0,326	-0,0935	0	-0,094	+0,755	-0,187	+0,085
20°	+0,0226	-0,0245	+0,350	-0,0879	-0,0126	-0,100		+0,707	-0,120	+0,137
40°	+0,0425	-0,0199	+0,374	-0,0716	-0,0237	-0,095		+0,658	-0,135	+0,435
60°	+0,0573	-0,0130	+0,396	-0,0468	-0,0319	-0,079		+0,615	-0,142	+0,492
80°	+0,0651	-0,0045	+0,412	-0,0162	-0,0363	-0,053		+0,580	-0,098	+0,376
100°	+0,0651	+0,0045	+0,421	+0,0162	-0,0363	-0,020		+0,562	-0,213	+0,209
120°	+0,0573	+0,0130	+0,422	+0,0468	-0,0319	+0,015		+0,563	-0,092	-0,196
140°	+0,0425	+0,0199	+0,414	+0,0716	-0,0237	+0,048		+0,578	+0,008	-0,595
160°	+0,0226	+0,0245	+0,399	+0,0879	-0,0126	+0,075		+0,609	-0,014	-0,371
180°	0	+0,0260	+0,378	+0,0935	0	+0,094		+0,651	+0,049	-0,058
200°	-0,0226	+0,0245	+0,354	+0,0879	+0,0126	+0,101		+0,699	+0,121	+0,169
220°	-0,0425	+0,0199	+0,329	+0,0716	+0,0237	+0,095		+0,748	+0,191	+0,239
240°	-0,0573	+0,0130	+0,307	+0,0468	+0,0319	+0,079		+0,791	+0,062	+0,370
260°	-0,0651	+0,0045	+0,291	+0,0162	+0,0363	+0,053		+0,824	-0,125	-0,013
280°	-0,0651	-0,0045	+0,282	-0,0162	+0,0363	+0,020		+0,842	-0,293	-0,207
300°	-0,0573	-0,0130	+0,281	-0,0468	+0,0319	-0,015		+0,844	-0,177	-0,530
320°	-0,0425	-0,0199	+0,289	-0,0716	+0,0237	-0,048		+0,828	-0,148	-0,443
340°	-0,0226	-0,0245	+0,305	-0,0879	+0,0126	-0,075		+0,797	-0,234	-0,136

$\frac{\partial X}{\partial r} - \frac{\sum \gamma_i}{r}$	Remuneration $\frac{100}{r} \left(\frac{\partial X}{\partial r} \right)_r$	$\frac{\partial X}{\partial r} - \frac{\sum \gamma_i}{r}$
-0,452	-0,100	-0,352
-0,361	-0,026	-0,336
-0,109	+0,116	-0,225
+0,297	+0,307	-0,010
+0,694	+0,462	+0,232
+1,054	+0,545	+0,509
+0,960	+0,491	+0,469
+0,404	+0,296	+0,109
-0,133	+0,057	-0,190
-0,282	-0,107	-0,176
-0,199	-0,034	-0,166
+0,033	+0,102	-0,069
+0,376	+0,288	+0,088
+0,749	+0,538	+0,212
+0,740	+0,515	+0,226
+0,222	+0,256	-0,034
-0,274	-0,050	-0,224
-0,498	-0,135	-0,363

$\varphi = 0^\circ$

$\varphi = +20^\circ$

λ	$\varphi = 0^\circ$				$\varphi = +20^\circ$			
	Z Dynes	$\frac{3}{r} Z \cdot 10^9$ 4,71149922	K	$(K + \frac{3}{r} Z) 10^9$	Z	$\frac{3}{r} Z \cdot 10^9$	K	$(K + \frac{3}{r} Z) 10^9$
60°	-0,0564	-0,266	-0,148	-0,414	-0,0050	-0,024	-0,006	-0,030
70°	- 379	-0,179	-0,129	-0,308	+ 201	+0,095	-0,021	+0,074
80°	- 217	-0,102	-0,114	-0,216	+ 462	+0,218	+0,039	+0,257
90°	- 69	-0,033	-0,094	-0,127	+ 679	+0,320	+0,072	+0,392
100°	+ 93	+0,044	-0,027	+0,017	+ 882	+0,416	+0,149	+0,565
110°	+ 274	+0,129	+0,030	+0,159	+ 1074	+0,478	+0,196	+0,674
120°	+ 353	+0,166	+0,082	+0,248	+ 1072	+0,477	+0,186	+0,663
130°	+ 354	+0,167	+0,100	+0,267	+ 902	+0,425	+0,121	+0,546
140°	+ 300	+0,141	+0,057	+0,198	+ 683	+0,322	+0,055	+0,377
150°	+ 228	+0,107	+0,047	+0,154	+ 440	+0,207	+0,006	+0,213
160°	+ 217	+0,102	+0,048	+0,150	+ 235	+0,111	+0,041	+0,152
170°	+ 240	+0,113	+0,104	+0,217	+ 132	+0,062	+0,059	+0,121
180°	+ 260	+0,122	+0,200	+0,322	+ 136	+0,064	+0,157	+0,221
190°	+ 213	+0,100	+0,174	+0,274	+ 152	+0,072	+0,124	+0,196
200°	+ 86	+0,041	+0,149	+0,190	+ 174	+0,082	+0,112	+0,194

$+20^\circ$ $\varphi = +40^\circ$

K	$(K + \frac{3}{2}Z)10^9$	Z	$\frac{3}{2}Z \cdot 10^9$	K	$(K + \frac{3}{2}Z)10^9$
0,006	-0,030	+ 0,0344	+0,162	+0,205	+0,267
0,021	+0,074	+ 633	+0,298	+0,261	+0,559
0,039	+0,257	+ 877	+0,413	+0,313	+0,726
0,072	+0,292	+ 1097	+0,517	+0,418	+0,935
0,149	+0,565	+ 1278	+0,602	+0,473	+1,075
0,196	+0,674	+ 1341	+0,632	+0,443	+1,075
0,186	+0,663	+ 1270	+0,598	+0,362	+0,960
0,121	+0,546	+ 1042	+0,491	+0,247	+0,738
0,055	+0,377	+ 701	+0,330	+0,025	+0,255
0,006	+0,213	+ 344	+0,162	-0,112	+0,050
0,041	+0,152	+ 58	+0,027	-0,154	-0,127
0,059	+0,121	- 117	-0,055	-0,168	-0,223
0,151	+0,215	- 201	-0,095	-0,115	-0,210
0,124	+0,196	- 204	-0,096	-0,096	-0,192
0,112	+0,194	- 165	-0,078	-0,079	-0,157

$\lambda_\tau \varphi_\tau \frac{\mu}{r^3} \frac{1}{r} \varphi_0 \lambda_0$... $\varphi = -60$ és $\varphi = +60$

$$\left. \begin{aligned} \sum \int Z \sin \lambda &= -n \frac{\mu}{r^3} \cos \varphi_\tau \sin \lambda_\tau \sum \cos \varphi \\ \sum \int Z \cos \lambda &= -n \frac{\mu}{r^3} \cos \varphi_\tau \cos \lambda_\tau \sum \cos \varphi \end{aligned} \right\} 1)$$

$$\left. \begin{aligned} \sum \int Y \sin \lambda &= \frac{n}{2} \sqrt{\frac{\mu}{r^3}} \sin \varphi_\tau \cos \lambda_\tau \\ \sum \int Y \cos \lambda &= -\frac{n}{2} \sqrt{\frac{\mu}{r^3}} \cos \varphi_\tau \sin \lambda_\tau \end{aligned} \right\} 2$$

$$\sum \int X = -n \frac{\mu}{r^3} \sin \varphi_\tau \sum \cos \varphi \quad 3) \quad \sum \int Z =$$

$$\begin{aligned} \sum \int Z \sin \lambda &= -5,61 & \sum \int Z \cos \lambda &= +3,09 \\ \sum \int Y \sin \lambda &= +1,84 & \sum \int Y \cos \lambda &= -3,47 \end{aligned}$$

$$\sum \cos \varphi = 5,4114$$

$$\sum \int X = +30,42$$

$$1) \quad \begin{cases} -5,61 = -97,41 \cos \varphi_\tau \sin \lambda_\tau \frac{\mu}{r^3} & \sin \lambda_\tau = -0,8759 \\ +3,09 = -97,41 \cos \varphi_\tau \cos \lambda_\tau \frac{\mu}{r^3} & \cos \lambda_\tau = +0,4826 \end{cases}$$

$$\tan \lambda_\tau = -1,8155 \quad \lambda_\tau = 298^\circ 51'$$

$$2) \text{ ellenőrzés } (\tan \lambda_\tau = -1,8858 \quad \lambda_\tau = 297^\circ 57')$$

$$1) \text{ egyenletrendszer megoldása} \quad \frac{\mu}{r^3} \cos \varphi_\tau = -0,06575$$

$$2) \text{ egyenletrendszer megoldása} \quad \frac{\mu}{r^3} \sin \varphi_\tau = -0,2123$$

$$\tan \varphi_\tau = 4,7498$$

$$\varphi_\tau = 258^\circ 7'$$

$$\sin \varphi_\tau = -0,9785$$

$$\cos \varphi_\tau = -0,2062$$

$$\frac{\mu}{r^3} = 0,31914$$

$$\beta \quad N = -11,68$$

$$\sum \cos^2 \varphi = 4,4408$$

$$\sum \cos 2\varphi = 1,8792$$

$$\cos^2 \lambda_T = 0,2329$$

$$\sin^2 \lambda_T = 0,7672$$

$$\frac{N}{\sum \cos 2\varphi \cdot \sin^2 \frac{\lambda_0}{r}} = -0,3607$$

$$\frac{\cos \varphi_T}{\sin \varphi_T} = 0,2105$$

$$\sum X_{\text{end}} = -0,06$$

$$\sum S \lambda = 0,72$$

$$\sum SX \cos \lambda = -1,31$$

$$+0,72 = +11,429 \frac{L}{r} \sin \varphi_0 + 0,04800 - 0,01011 \frac{L}{r} \sin \varphi_0 - 0,00399 - 0,03330 \frac{L}{r} \sin \varphi_0$$

$$+0,6760 = 11,386 \frac{L}{r} \sin \varphi_0$$

$$\frac{L}{r} \sin \varphi_0 = 0,05937$$

I) bit :

$$+0,003705 = +0,010723 + \sin \varphi_T \cos \varphi_0 \frac{L}{r} \sin \lambda_0$$

$$+0,08090 = -0,005908 + \sin \varphi_T \cos \varphi_0 \frac{L}{r} \cos \lambda_0$$

$$\tan \lambda_0 = -0,08084$$

$$\sin \lambda_0 = 0,0805$$

$$\lambda_0 = 175^\circ 23'$$

$$\cos \lambda_0 = -0,9968$$

$$-0,007018 = -0,07877 \frac{L}{r} \cos \varphi_0$$

$$\frac{L}{r} \cos \varphi_0 = 0,08909$$

$$\frac{L}{r^2} = 0,31914$$

$$\cos(\lambda_0 + \lambda_T) = -0,4105$$

$$\sin(\lambda_0 + \lambda_T) = +0,9120$$

$$\frac{L}{r} \tan \varphi_0 = 0,6664$$

$$\frac{3ML}{r^2 V} = 0,1025$$

$$\varphi_0 = 33^\circ 41'$$

$$\sin \varphi_0 = 0,5546$$

$$\cos \varphi_0 = 0,8321$$

$$\frac{L}{r} = 0,1071$$

$$\sin \varphi_T = -0,9875 \quad \sin \lambda_T = -0,8759$$

$$\cos \varphi_T = -0,2062 \quad \cos \lambda_T = +0,4826$$

$$\cos \varphi_T \cos \lambda_T = -0,0995$$

$$\sin \varphi_T \cos \lambda_T = -0,4722$$

$$\cos \varphi_T \cos \lambda_T \sin \varphi_0 = -0,0552$$

$$\cos \varphi_T \sin \lambda_T = +0,1806$$

$$\sin \varphi_T \sin \lambda_T = +0,8571$$

$$\cos \varphi_T \cos \lambda_T \cos \varphi_0 = -0,0828$$

$$\cos \varphi_T \sin \lambda_T \sin \varphi_0 = +0,1002$$

$$\cos \varphi_T \sin \lambda_T \cos \varphi_0 = +0,1503$$

$$\cos \varphi_0 \cos \lambda_0 = -0,8294$$

$$\sin \varphi_0 \cos \lambda_0 = -0,5528$$

$$\cos \varphi_0 \cos \lambda_0 \sin \varphi_T = +0,8116$$

$$\cos \varphi_0 \sin \lambda_0 = +0,0670$$

$$\sin \varphi_0 \sin \lambda_0 = +0,0446$$

$$\cos \varphi_0 \sin \lambda_0 \sin \varphi_T = -0,0656$$

$$\cos \varphi_0 \cos \varphi_T = -0,1716$$

$$\sin \varphi_0 \sin \varphi_T = -0,5427$$

$$\sin \lambda_0 \sin \lambda_T = -0,0705$$

X =

$$y = (-0,0318 + 0,0775 \sin \varphi) \sin \lambda + (-0,0576 - 0,0035 \sin \varphi) \cos \lambda - 0,0072 \cos \varphi \sin 2\lambda + 0,0160 \cos 2\lambda \cos \varphi$$

$$Z = [+0,1210 + 0,6303 \sin \varphi - 0,1706 \cos^2 \varphi] + [-0,1153 \cos \varphi - 0,0053 \sin 2\varphi] \sin \lambda + [+0,0635 \cos \varphi - 0,1163 \sin 2\varphi] \cos \lambda - 0,0216 \cos^2 \varphi \sin 2\lambda + 0,0241 \cos^2 \varphi \sin 2\lambda$$

Z

φ	
-60	-0,4675 - 0,0501 sin λ + 0,1325 cos λ - 0,0054 cos² λ + 0,0060 sin 2λ
-40	+0,3842 - 0,0831 sin λ + 0,1632 cos λ - 0,0127 cos² λ + 0,0141 sin 2λ
-20	+0,2450 - 0,1049 sin λ + 0,1345 cos λ - 0,0191 cos² λ + 0,0213 sin 2λ
0	-0,0494 - 0,1153 sin λ + 0,0635 cos λ - 0,0216 cos² λ + 0,0241 sin 2λ
+20	+0,1862 - 0,1117 sin λ - 0,0151 cos λ - 0,0191 cos² λ + 0,0213 sin 2λ
+40	+0,4261 - 0,0935 sin λ - 0,0660 cos λ - 0,0127 cos² λ + 0,0141 sin 2λ
+60	+0,6241 - 0,0623 sin λ - 0,0689 cos λ - 0,0054 cos² λ + 0,0060 sin 2λ

8759
4826

$$\begin{aligned}
X = & -\frac{V_\alpha}{r^3} \cos \varphi + \frac{V_\beta}{r^3} \sin \varphi \sin \lambda - \frac{V_\gamma}{r^3} \sin \varphi \cos \lambda && \text{Asterint rendezve} \\
& -\frac{3V_\alpha}{r^4} a_0 \sin 2\varphi - \frac{3V_\beta}{r^4} a_0 \cos 2\varphi \sin \lambda + \frac{3V_\gamma}{r^4} a_0 \cos 2\varphi \cos \lambda \\
& -3\frac{V_\alpha}{r^4} b_0 \cos 2\varphi \sin \lambda - \frac{3}{2}\frac{V_\gamma}{r^4} b_0 \sin 2\varphi \sin 2\lambda + 3\frac{V_\beta}{r^4} b_0 \sin 2\varphi \sin^2 \lambda \\
& +3\frac{V_\alpha}{r^4} c_0 \cos 2\varphi \cos \lambda - \frac{3}{2}\frac{V_\beta}{r^4} c_0 \sin 2\varphi \sin 2\lambda + 3\frac{V_\gamma}{r^4} c_0 \sin 2\varphi \cos^2 \lambda \\
& +\frac{9}{2}\frac{V_\alpha}{r^5} A^2 \cos \varphi - \frac{45}{2}\frac{V_\alpha}{r^5} A^2 \sin^2 \varphi \cos \varphi + \left(-\frac{33}{2}\frac{V_\beta}{r^5} A^2 \sin \varphi + \frac{45}{2}\frac{V_\beta}{r^5} A^2 \sin^3 \varphi\right) \sin \lambda + \\
& +\left(\frac{33}{2}\frac{V_\gamma}{r^5} A^2 \sin \varphi - \frac{45}{2}\frac{V_\gamma}{r^5} A^2 \sin^3 \varphi\right) \cos \lambda \\
& +\frac{3}{2}\frac{V_\alpha}{r^5} B^2 \cos \varphi - \frac{9}{2}\frac{V_\beta}{r^5} B^2 \sin \varphi \sin \lambda + \left(\frac{3}{2}\frac{V_\gamma}{r^5} B^2 \sin \varphi - \frac{45}{2}\frac{V_\gamma}{r^5} B^2 \cos^2 \varphi \sin \varphi\right) \cos \lambda \\
& +\left(-15\frac{V_\alpha}{r^5} B^2 \cos \varphi - \frac{45}{2}\frac{V_\alpha}{r^5} B^2 \cos^3 \varphi\right) \sin^2 \lambda + \frac{45}{2}\frac{V_\beta}{r^5} B^2 \sin \varphi \cos^2 \varphi \sin^3 \lambda + \\
& +\frac{45}{2}\frac{V_\gamma}{r^5} B^2 \sin \varphi \cos^2 \varphi \cos^3 \lambda \\
& +\frac{3}{2}\frac{V_\alpha}{r^5} C^2 \cos \varphi + \left(-\frac{3}{2}\frac{V_\beta}{r^5} C^2 \sin \varphi + \frac{45}{2}\frac{V_\beta}{r^5} C^2 \sin \varphi \cos^2 \varphi\right) \sin \lambda + \\
& +\frac{9}{2}\frac{V_\gamma}{r^5} C^2 \sin \varphi \cos \lambda + \left(-\frac{45}{2}\frac{V_\alpha}{r^5} C^2 \cos^3 \varphi + 15\frac{V_\alpha}{r^5} C^2 \cos \varphi\right) \cos^2 \lambda - \\
& -\frac{45}{2}\frac{V_\beta}{r^5} C^2 \cos^2 \varphi \sin \varphi \sin^3 \lambda - \frac{45}{2}\frac{V_\gamma}{r^5} C^2 \cos^2 \varphi \sin \varphi \cos^3 \lambda \\
& -\left(\frac{21}{2}\frac{V_\alpha}{r^5} AB \sin 2\varphi \cos \varphi + 12\frac{V_\alpha}{r^5} AB \sin \varphi \cos 2\varphi\right) \sin \lambda + \\
& +\left(-\frac{21}{4}\frac{V_\gamma}{r^5} AB \sin \varphi \sin 2\varphi + \frac{3}{2}\frac{V_\gamma}{r^5} AB \cos \varphi + 6\frac{V_\gamma}{r^5} AB \cos \varphi \cos 2\varphi\right) \sin 2\lambda \\
& +\left(\frac{21}{2}\frac{V_\beta}{r^5} AB \sin \varphi \sin 2\varphi - 12\frac{V_\beta}{r^5} AB \cos \varphi \cos 2\varphi\right) \sin^2 \lambda + 3\frac{V_\beta}{r^5} AB \cos \varphi \cos^2 \lambda \\
& +\left(21\frac{V_\gamma}{r^5} BC \sin \varphi \cos^2 \varphi - 3\frac{V_\gamma}{r^5} BC \sin \varphi + 12\frac{V_\gamma}{r^5} BC \cos \varphi \sin 2\varphi\right) \sin \lambda \\
& +\left(-21\frac{V_\beta}{r^5} BC \cos^2 \varphi \sin \varphi + 3\frac{V_\beta}{r^5} BC \sin \varphi - 12\frac{V_\beta}{r^5} BC \sin 2\varphi \cos \varphi\right) \cos \lambda \\
& +\left(-15\frac{V_\alpha}{r^5} BC \cos \varphi + \frac{45}{2}\frac{V_\alpha}{r^5} BC \cos^3 \varphi\right) \sin 2\lambda - \left(21\frac{V_\gamma}{r^5} BC \sin \varphi \cos^2 \varphi + \right. \\
& \left.+ 12\frac{V_\gamma}{r^5} BC \cos \varphi \sin 2\varphi\right) \sin^3 \lambda + \left(21\frac{V_\beta}{r^5} BC \cos^2 \varphi \sin \varphi + 12\frac{V_\beta}{r^5} BC \sin 2\varphi \cos \varphi\right) \times \\
& \times \cos^3 \lambda \\
& +\left(\frac{21}{2}\frac{V_\alpha}{r^5} AC \sin 2\varphi \cos \varphi + 12\frac{V_\alpha}{r^5} AC \sin \varphi \cos 2\varphi\right) \cos \lambda + \left(-\frac{21}{4}\frac{V_\beta}{r^5} AC \sin 2\varphi \sin \varphi + \right. \\
& \left. +\frac{3}{2}\frac{V_\beta}{r^5} AC \cos \varphi + 6\frac{V_\beta}{r^5} AC \cos 2\varphi \cos \varphi\right) \sin 2\lambda + 3\frac{V_\gamma}{r^5} AC \cos \varphi \sin^2 \lambda + \\
& +\left(\frac{21}{2}\frac{V_\gamma}{r^5} AC \sin 2\varphi \sin \varphi - 12\frac{V_\gamma}{r^5} AC \cos 2\varphi \cos \varphi\right) \cos^2 \lambda
\end{aligned}$$

$$\begin{aligned}
 Z = & -2 \frac{V_\alpha}{r^3} \sin \varphi - 2 \frac{V_\beta}{r^3} \cos \varphi \sin \lambda + 2 \frac{V_\gamma}{r^3} \cos \varphi \cos \lambda + \\
 & + 3 \frac{V_\alpha}{r^4} a_0 - 9 \frac{V_\alpha}{r^4} a_0 \sin^2 \varphi - 9 \frac{V_\beta}{r^4} a_0 \sin 2\varphi \sin \lambda + 9 \frac{V_\gamma}{r^4} a_0 \sin 2\varphi \cos \lambda \\
 & + 3 \frac{V_\beta}{r^4} b_0 - 9 \frac{V_\alpha}{r^4} b_0 \sin 2\varphi \sin \lambda + 9 \frac{V_\gamma}{r^4} b_0 \cos^2 \varphi \sin 2\lambda - 9 \frac{V_\beta}{r^4} b_0 \cos^2 \varphi \sin^2 \lambda \\
 & + 3 \frac{V_\gamma}{r^4} c_0 + 9 \frac{V_\alpha}{r^4} c_0 \sin 2\varphi \cos \lambda + 9 \frac{V_\beta}{r^4} c_0 \cos^2 \varphi \sin 2\lambda - 9 \frac{V_\gamma}{r^4} c_0 \cos^2 \varphi \cos^2 \lambda \\
 & + 18 \frac{V_\alpha}{r^5} A^2 \sin \varphi - 30 \frac{V_\alpha}{r^5} A^2 \sin^3 \varphi + (-24 \frac{V_\beta}{r^5} A^2 \cos \varphi + 30 \frac{V_\gamma}{r^5} A^2 \cos^3 \varphi) \sin \lambda + \\
 & + (24 \frac{V_\gamma}{r^5} A^2 \cos \varphi - 30 \frac{V_\beta}{r^5} A^2 \cos^3 \varphi) \cos \lambda + \\
 & + 6 \frac{V_\alpha}{r^5} B^2 \sin \varphi + 18 \frac{V_\beta}{r^5} B^2 \cos \varphi \sin \lambda + (-6 \frac{V_\gamma}{r^5} B^2 \cos \varphi + 30 \frac{V_\beta}{r^5} B^2 \cos^3 \varphi) \cos \lambda \\
 & + (-30 \frac{V_\alpha}{r^5} B^2 \sin \varphi + 30 \frac{V_\alpha}{r^5} B^2 \sin^3 \varphi) \sin^2 \lambda - 30 \frac{V_\beta}{r^5} B^2 \cos^2 \varphi \sin^2 \lambda - 30 \frac{V_\gamma}{r^5} B^2 \cos^2 \varphi \cos^2 \lambda \\
 & + 6 \frac{V_\alpha}{r^5} C^2 \sin \varphi + (6 \frac{V_\beta}{r^5} C^2 \cos \varphi - 30 \frac{V_\gamma}{r^5} C^2 \cos^3 \varphi) \sin \lambda - 18 \frac{V_\beta}{r^5} C^2 \cos \varphi \cos \lambda \\
 & + (-30 \frac{V_\alpha}{r^5} C^2 \sin \varphi + 30 \frac{V_\alpha}{r^5} C^2 \sin^3 \varphi) \cos^2 \lambda + 30 \frac{V_\beta}{r^5} C^2 \cos^2 \varphi \sin^2 \lambda + 30 \frac{V_\gamma}{r^5} C^2 \cos^2 \varphi \cos^2 \lambda \\
 & + 12 \frac{V_\beta}{r^5} AB \sin \varphi + (-48 \frac{V_\alpha}{r^5} AB \cos \varphi + 60 \frac{V_\alpha}{r^5} AB \cos^3 \varphi) \sin \lambda + \\
 & + (30 \frac{V_\gamma}{r^5} AB \sin \varphi - 30 \frac{V_\beta}{r^5} AB \sin^3 \varphi) \sin 2\lambda + (-60 \frac{V_\beta}{r^5} AB \sin \varphi + 60 \frac{V_\beta}{r^5} AB \sin^3 \varphi) \sin^2 \lambda \\
 & + (12 \frac{V_\gamma}{r^5} B\ell \cos \varphi - 60 \frac{V_\beta}{r^5} B\ell \cos^3 \varphi) \sin \lambda + (-12 \frac{V_\beta}{r^5} B\ell \cos \varphi + 60 \frac{V_\beta}{r^5} B\ell \cos^3 \varphi) \cos \lambda \\
 & + (30 \frac{V_\alpha}{r^5} B\ell \sin \varphi - 30 \frac{V_\alpha}{r^5} B\ell \sin^3 \varphi) \sin 2\lambda + 60 \frac{V_\beta}{r^5} B\ell \cos^2 \varphi \sin^2 \lambda - \\
 & - 60 \frac{V_\beta}{r^5} B\ell \cos^2 \varphi \cos^2 \lambda + \\
 & + 12 \frac{V_\gamma}{r^5} A\ell \sin \varphi + (48 \frac{V_\alpha}{r^5} A\ell \cos \varphi - 60 \frac{V_\alpha}{r^5} A\ell \cos^3 \varphi) \cos \lambda + (30 \frac{V_\beta}{r^5} A\ell \sin \varphi - \\
 & - 30 \frac{V_\beta}{r^5} A\ell \sin^3 \varphi) \sin 2\lambda + (-60 \frac{V_\beta}{r^5} A\ell \sin \varphi + 60 \frac{V_\beta}{r^5} A\ell \sin^3 \varphi) \cos^2 \lambda
 \end{aligned}$$

Állapot:

$$\begin{aligned} X = & -\frac{V_d}{r^2} \cos \varphi + \frac{V_A}{r^3} \sin \varphi \sin \lambda - \frac{V_r}{r^2} \sin \varphi \cos \lambda \\ & - \frac{3V_d}{r^4} a_0 \sin 2\varphi - \frac{3V_A}{r^4} a_0 \cos 2\varphi \sin \lambda + \frac{3V_r}{r^4} a_0 \cos 2\varphi \cos \lambda \\ & - 3\frac{V_d}{r^4} b_0 \cos 2\varphi \sin \lambda - \frac{3}{2} \frac{V_r}{r^4} b_0 \sin 2\varphi \sin 2\lambda + 3\frac{V_A}{r^4} b_0 \sin 2\varphi \sin^2 \lambda \\ & + 3\frac{V_d}{r^4} c_0 \cos 2\varphi \cos \lambda - \frac{3}{2} \frac{V_A}{r^4} c_0 \sin 2\varphi \sin 2\lambda + 3\frac{V_r}{r^4} c_0 \sin 2\varphi \cos^2 \lambda \\ & + \frac{9}{2} \frac{V_d}{r^5} A^2 \cos \varphi - \frac{45}{2} \frac{V_d}{r^5} A^2 \sin^2 \varphi \cos \varphi + \left(-\frac{33}{2} \frac{V_A}{r^5} A^2 \sin \varphi + \frac{45}{2} \frac{V_A}{r^5} A^2 \sin^3 \varphi \right) \sin \lambda \\ & \quad + \left(\frac{33}{2} \frac{V_r}{r^5} A^2 \sin \varphi - \frac{45}{2} \frac{V_r}{r^5} A^2 \sin^3 \varphi \right) \cos \lambda \\ & + \frac{3}{2} \frac{V_d}{r^5} B^2 \cos \varphi - \frac{9}{2} \frac{V_A}{r^5} B^2 \sin \varphi \sin \lambda + \left(-21 \frac{V_r}{r^5} B^2 \sin \varphi + \frac{45}{2} \frac{V_r}{r^5} B^2 \sin^3 \varphi \right) \cos \lambda \\ & + \left(15 \frac{V_d}{r^5} B^2 \cos \varphi - \frac{45}{2} \frac{V_d}{r^5} B^2 \cos^3 \varphi \right) \sin^2 \lambda + \left(\frac{45}{2} \frac{V_A}{r^5} B^2 \sin \varphi - \frac{45}{2} \frac{V_A}{r^5} B^2 \sin^3 \varphi \right) \sin^2 \lambda \\ & \quad + \left(\frac{45}{2} \frac{V_r}{r^5} B^2 \sin \varphi - \frac{45}{2} \frac{V_r}{r^5} B^2 \sin^3 \varphi \right) \cos^2 \lambda \\ & + \frac{3}{2} \frac{V_d}{r^5} C^2 \cos \varphi + \left(21 \frac{V_A}{r^5} C^2 \sin \varphi - \frac{45}{2} \frac{V_A}{r^5} C^2 \sin^3 \varphi \right) \sin \lambda + \frac{9}{2} \frac{V_r}{r^5} C^2 \sin \varphi \cos \lambda \\ & \quad + \left(-\frac{45}{2} \frac{V_d}{r^5} C^2 \cos^3 \varphi + 15 \frac{V_d}{r^5} C^2 \cos \varphi \right) \cos^2 \lambda + \left(-\frac{45}{2} \frac{V_A}{r^5} C^2 \sin \varphi + \frac{45}{2} \frac{V_A}{r^5} C^2 \sin^3 \varphi \right) \sin^2 \lambda \\ & \quad + \left(-\frac{45}{2} \frac{V_r}{r^5} C^2 \sin \varphi + \frac{45}{2} \frac{V_r}{r^5} C^2 \sin^3 \varphi \right) \cos^2 \lambda \\ & - \left(33 \frac{V_d}{r^5} AB \sin \varphi - 45 \frac{V_d}{r^5} AB \sin^3 \varphi \right) \sin \lambda + \left(-15 \frac{V_r}{r^5} AB \cos \varphi + \frac{45}{2} \frac{V_r}{r^5} AB \cos^3 \varphi \right) \sin 2\lambda \\ & + \left(33 \frac{V_A}{r^5} AB \cos \varphi - 45 \frac{V_A}{r^5} AB \cos^3 \varphi \right) \sin^2 \lambda + 3 \frac{V_r}{r^5} AB \cos \varphi \cos^2 \lambda \\ & + \left(42 \frac{V_r}{r^5} BC \sin \varphi - 45 \frac{V_r}{r^5} BC \sin^3 \varphi \right) \sin \lambda + \left(-42 \frac{V_A}{r^5} BC \sin \varphi + 45 \frac{V_A}{r^5} BC \sin^3 \varphi \right) \cos \lambda \\ & + \left(-15 \frac{V_d}{r^5} BC \cos \varphi + \frac{45}{2} \frac{V_d}{r^5} BC \cos^3 \varphi \right) \sin 2\lambda + \left(45 \frac{V_r}{r^5} BC \sin \varphi + 45 \frac{V_r}{r^5} BC \sin^3 \varphi \right) \sin^2 \lambda \\ & + \left(45 \frac{V_A}{r^5} BC \sin \varphi - 45 \frac{V_A}{r^5} BC \sin^3 \varphi \right) \cos^2 \lambda \\ & + \left(33 \frac{V_d}{r^5} AC \sin \varphi - 45 \frac{V_d}{r^5} AC \sin^3 \varphi \right) \cos \lambda \\ & + \left(-15 \frac{V_A}{r^5} AC \cos \varphi + \frac{45}{2} \frac{V_A}{r^5} AC \cos^3 \varphi \right) \sin 2\lambda + 3 \frac{V_r}{r^5} AC \cos \varphi \sin^2 \lambda \\ & + \left(33 \frac{V_r}{r^5} AC \cos \varphi - 45 \frac{V_r}{r^5} AC \cos^3 \varphi \right) \cos^2 \lambda \end{aligned}$$

MAGYAR
TUDOMÁNYOS AKADÉMIA
KÖNYVTÁRA

$$\chi = -\frac{V_\alpha}{r^3} \cos \varphi + \frac{V_\beta}{r^3} \sin \varphi \sin \lambda - \frac{V_\gamma}{r^3} \sin \varphi \cos \lambda$$

λ meridi :

$$- \frac{3V_\alpha}{r^4} a_0 \sin 2\varphi - 3 \frac{V_A}{r^4} a_0 \cos 2\varphi \sin \lambda + 3 \frac{V_\gamma}{r^4} a_0 \cos 2\varphi \cos \lambda$$

$$- 3 \frac{V_\alpha}{r^4} b_0 \cos 2\varphi \sin \lambda - \frac{3}{2} \frac{V_\gamma}{r^4} b_0 \sin 2\varphi \sin 2\lambda + 3 \frac{V_A}{r^4} b_0 \sin 2\varphi \sin^2 \lambda$$

$$+ 3 \frac{V_\alpha}{r^4} c_0 \cos 2\varphi \cos \lambda - \frac{3}{2} \frac{V_A}{r^4} c_0 \sin 2\varphi \sin 2\lambda + 3 \frac{V_\gamma}{r^4} c_0 \sin 2\varphi \cos^2 \lambda$$

$$+ \frac{9}{2} \frac{V_\alpha}{r^5} A^2 \cos \varphi - \frac{45}{2} \frac{V_\alpha}{r^5} A^2 \sin^2 \varphi \cos \varphi + \left(-\frac{33}{2} \frac{V_A}{r^5} A^2 \sin \varphi + \frac{45}{2} \frac{V_A}{r^5} A^2 \sin^3 \varphi \right) \sin \lambda$$

$$+ \left(\frac{33}{2} \frac{V_\gamma}{r^5} A^2 \sin \varphi - \frac{45}{2} \frac{V_\gamma}{r^5} A^2 \sin^3 \varphi \right) \cos \lambda$$

$$+ \frac{3}{2} \frac{V_\alpha}{r^5} B^2 \cos \varphi - \frac{9}{2} \frac{V_A}{r^5} B^2 \sin \varphi \sin \lambda + \left(\frac{3}{2} \frac{V_\gamma}{r^5} B^2 \sin \varphi - \frac{45}{2} \frac{V_\gamma}{r^5} B^2 \cos^2 \varphi \sin \varphi \right) \cos \lambda$$

$$+ \left(15 \frac{V_\alpha}{r^5} B^2 \cos \varphi - \frac{45}{2} \frac{V_\alpha}{r^5} B^2 \cos^3 \varphi \right) \sin^2 \lambda + \frac{45}{2} \frac{V_A}{r^5} B^2 \sin \varphi \cos^2 \varphi \sin^2 \lambda$$

$$+ \frac{45}{2} \frac{V_\gamma}{r^5} B^2 \sin \varphi \cos^2 \varphi \cos^2 \lambda$$

$$+ \frac{3}{2} \frac{V_\alpha}{r^5} C^2 \cos \varphi + \left(-\frac{3}{2} \frac{V_A}{r^5} C^2 \sin \varphi + \frac{45}{2} \frac{V_B}{r^5} C^2 \sin \varphi \cos^2 \varphi \right) \sin \lambda + \frac{9}{2} \frac{V_\gamma}{r^5} C^2 \sin \varphi \cos \lambda$$

$$+ \left(-\frac{45}{2} \frac{V_\alpha}{r^5} C^2 \cos^3 \varphi + 15 \frac{V_\alpha}{r^5} C^2 \cos \varphi \right) \cos^2 \lambda - \frac{45}{2} \frac{V_B}{r^5} C^2 \cos^2 \varphi \sin \varphi \sin^2 \lambda$$

$$- \frac{45}{2} \frac{V_\gamma}{r^5} C^2 \cos^2 \varphi \sin \varphi \cos^2 \lambda$$

$$- \left(\frac{21}{2} \frac{V_\alpha}{r^5} AB \sin 2\varphi \cos \varphi + 12 \frac{V_\alpha}{r^5} AB \sin \varphi \cos 2\varphi \right) \sin \lambda$$

$$+ \left(-\frac{21}{4} \frac{V_\gamma}{r^5} AB \sin \varphi \sin 2\varphi + \frac{3}{2} \frac{V_\gamma}{r^5} AB \cos \varphi + 6 \frac{V_\gamma}{r^5} AB \cos \varphi \cos 2\varphi \right) \sin 2\lambda$$

$$+ \left(\frac{21}{2} \frac{V_A}{r^5} AB \sin \varphi \sin 2\varphi - 12 \frac{V_A}{r^5} AB \cos \varphi \cos 2\varphi \right) \sin^2 \lambda + 3 \frac{V_A}{r^5} AB \cos \varphi \cos^2 \lambda$$

$$+ \left(21 \frac{V_\gamma}{r^5} BC \sin \varphi \cos^2 \varphi - 3 \frac{V_\gamma}{r^5} BC \sin \varphi + 12 \frac{V_\gamma}{r^5} BC \cos \varphi \sin 2\varphi \right) \sin \lambda$$

$$+ \left(-21 \frac{V_A}{r^5} BC \cos^2 \varphi \sin \varphi + 3 \frac{V_A}{r^5} BC \sin \varphi - 12 \frac{V_A}{r^5} BC \sin 2\varphi \cos \varphi \right) \cos \lambda$$

$$+ \left(-15 \frac{V_\alpha}{r^5} BC \cos \varphi + \frac{45}{2} \frac{V_\alpha}{r^5} BC \cos^3 \varphi \right) \sin 2\lambda - \left(21 \frac{V_\gamma}{r^5} BC \sin \varphi \cos^2 \varphi + 12 \frac{V_\gamma}{r^5} BC \cos \varphi \sin 2\varphi \right) \sin^2 \lambda$$

$$+ \left(21 \frac{V_A}{r^5} BC \cos^2 \varphi \sin \varphi + 12 \frac{V_A}{r^5} BC \sin 2\varphi \cos \varphi \right) \cos^2 \lambda$$

$$+ \left(\frac{21}{2} \frac{V_\alpha}{r^5} AC \sin 2\varphi \cos \varphi + 12 \frac{V_\alpha}{r^5} AC \sin \varphi \cos 2\varphi \right) \cos \lambda + \left(-\frac{21}{4} \frac{V_B}{r^5} AC \sin 2\varphi \sin \varphi + \frac{3}{2} \frac{V_B}{r^5} AC \cos \varphi + \right.$$

$$\left. + 6 \frac{V_A}{r^5} AC \cos 2\varphi \cos \varphi \right) \sin 2\lambda + 3 \frac{V_\gamma}{r^5} AC \cos \varphi \sin^2 \lambda + \left(\frac{21}{2} \frac{V_\gamma}{r^5} AC \sin \varphi \sin 2\varphi - 12 \frac{V_\gamma}{r^5} AC \cos \varphi \cos 2\varphi \right) \cos^2 \lambda$$

$$Z = -2 \frac{V_\alpha}{r^3} \sin \varphi - 2 \frac{V_A}{r^3} \cos \varphi \sin \lambda + 2 \frac{V_\gamma}{r^3} \cos \varphi \cos \lambda$$

λ merint:

$$+ 3 \frac{V_\alpha}{r^4} a_0 - 9 \frac{V_\alpha}{r^4} a_0 \sin^2 \varphi - \frac{9}{2} \frac{V_A}{r^4} a_0 \sin 2\varphi \sin \lambda + \frac{9}{2} \frac{V_\gamma}{r^4} a_0 \sin 2\varphi \cos \lambda$$

$$+ 3 \frac{V_A}{r^4} b_0 - \frac{9}{2} \frac{V_\alpha}{r^4} b_0 \sin 2\varphi \sin \lambda + \frac{9}{2} \frac{V_\gamma}{r^4} b_0 \cos^2 \varphi \sin 2\lambda - 9 \frac{V_A}{r^4} b_0 \cos^2 \varphi \sin^2 \lambda$$

$$+ 3 \frac{V_\gamma}{r^4} c_0 + \frac{9}{2} \frac{V_\alpha}{r^4} c_0 \sin 2\varphi \cos \lambda + \frac{9}{2} \frac{V_A}{r^4} c_0 \cos^2 \varphi \sin 2\lambda - 9 \frac{V_\gamma}{r^4} c_0 \cos^2 \varphi \cos^2 \lambda$$

$$+ 18 \frac{V_\alpha}{r^5} A^2 \sin \varphi - 30 \frac{V_\alpha}{r^5} A^2 \sin^3 \varphi + (-24 \frac{V_A}{r^5} A^2 \cos \varphi + 30 \frac{V_\gamma}{r^5} A^2 \cos^3 \varphi) \sin \lambda$$

$$+ (24 \frac{V_\gamma}{r^5} A^2 \cos \varphi - 30 \frac{V_\gamma}{r^5} A^2 \cos^3 \varphi) \cos \lambda$$

$$+ 6 \frac{V_\alpha}{r^5} B^2 \sin \varphi + 18 \frac{V_A}{r^5} B^2 \cos \varphi \sin \lambda + (-6 \frac{V_\gamma}{r^5} B^2 \cos \varphi + 30 \frac{V_\gamma}{r^5} B^2 \cos^3 \varphi) \cos \lambda$$

$$+ (-30 \frac{V_\alpha}{r^5} B^2 \sin \varphi + 30 \frac{V_\alpha}{r^5} B^2 \sin^3 \varphi) \sin^2 \lambda - 30 \frac{V_A}{r^5} B^2 \cos^2 \varphi \sin^2 \lambda - 30 \frac{V_\gamma}{r^5} B^2 \cos^3 \varphi \cos^2 \lambda$$

$$+ 6 \frac{V_\alpha}{r^5} C^2 \sin \varphi + (6 \frac{V_A}{r^5} C^2 \cos \varphi - 30 \frac{V_A}{r^5} C^2 \cos^3 \varphi) \sin \lambda - 18 \frac{V_\gamma}{r^5} C^2 \cos \varphi \cos \lambda$$

$$+ (-30 \frac{V_\alpha}{r^5} C^2 \sin \varphi + 30 \frac{V_\alpha}{r^5} C^2 \sin^3 \varphi) \cos^2 \lambda + 30 \frac{V_A}{r^5} C^2 \cos^2 \varphi \sin^2 \lambda + 30 \frac{V_\gamma}{r^5} C^2 \cos^3 \varphi \cos^2 \lambda$$

$$+ 12 \frac{V_A}{r^5} AB \sin \varphi + (-48 \frac{V_\alpha}{r^5} AB \cos \varphi + 60 \frac{V_\alpha}{r^5} AB \cos^3 \varphi) \sin \lambda$$

$$+ (30 \frac{V_\gamma}{r^5} AB \sin \varphi - 30 \frac{V_\gamma}{r^5} AB \sin^3 \varphi) \sin 2\lambda + (-60 \frac{V_A}{r^5} AB \sin \varphi + 60 \frac{V_A}{r^5} AB \sin^3 \varphi) \sin^2 \lambda$$

$$+ (12 \frac{V_\gamma}{r^5} BC \cos \varphi - 60 \frac{V_\gamma}{r^5} BC \cos^3 \varphi) \sin \lambda + (-12 \frac{V_A}{r^5} BC \cos \varphi + 60 \frac{V_A}{r^5} BC \cos^3 \varphi) \cos \lambda$$

$$+ (30 \frac{V_\alpha}{r^5} BC \sin \varphi - 30 \frac{V_\alpha}{r^5} BC \sin^3 \varphi) \sin 2\lambda + 60 \frac{V_\gamma}{r^5} BC \cos^2 \varphi \sin^2 \lambda - 60 \frac{V_A}{r^5} BC \cos^2 \varphi \cos^2 \lambda$$

$$+ 12 \frac{V_\gamma}{r^5} AC \sin \varphi + (48 \frac{V_\alpha}{r^5} AC \cos \varphi - 60 \frac{V_\alpha}{r^5} AC \cos^3 \varphi) \cos \lambda$$

$$+ (30 \frac{V_A}{r^5} AC \sin \varphi - 30 \frac{V_A}{r^5} AC \sin^3 \varphi) \sin 2\lambda + (-60 \frac{V_\gamma}{r^5} AC \sin \varphi + 60 \frac{V_\gamma}{r^5} AC \sin^3 \varphi) \cos^2 \lambda$$

λ merint:

$$y = -\frac{V_{\alpha}}{r^3} \sin \lambda - \frac{V_{\beta}}{r^3} \cos \lambda$$

$$-3\frac{V_{\alpha}}{r^4} a_0 \sin \varphi \sin \lambda - 3\frac{V_{\beta}}{r^4} a_0 \sin \varphi \cos \lambda$$

$$-3\frac{V_{\alpha}}{r^4} b_0 \sin \varphi \cos \lambda - 3\frac{V_{\beta}}{r^4} b_0 \cos \varphi \sin 2\lambda + 3\frac{V_{\gamma}}{r^4} b_0 \cos \varphi \cos 2\lambda$$

$$-3\frac{V_{\alpha}}{r^4} c_0 \sin \varphi \sin \lambda + 3\frac{V_{\beta}}{r^4} c_0 \cos \varphi \sin 2\lambda + 3\frac{V_{\gamma}}{r^4} c_0 \cos \varphi \cos 2\lambda$$

$$+ \left(\frac{3}{2} \frac{V_{\alpha}}{r^5} A^2 - \frac{15}{2} \frac{V_{\beta}}{r^5} A^2 \sin^2 \varphi \right) \sin \lambda + \left(\frac{3}{2} \frac{V_{\beta}}{r^5} A^2 - \frac{15}{2} \frac{V_{\alpha}}{r^5} A^2 \sin^2 \varphi \right) \cos \lambda$$

$$+ \left(\frac{3}{2} \frac{V_{\alpha}}{r^5} B^2 + 15 \frac{V_{\beta}}{r^5} B^2 \cos^2 \varphi \right) \sin \lambda + \left(\frac{3}{2} \frac{V_{\beta}}{r^5} B^2 - \frac{45}{2} \frac{V_{\alpha}}{r^5} B^2 \cos^2 \varphi \right) \cos \lambda$$

$$- \frac{15}{4} \frac{V_{\alpha}}{r^5} B^2 \sin 2\varphi \sin 2\lambda - \left(\frac{45}{2} \frac{V_{\beta}}{r^5} B^2 \cos^2 \varphi \sin^3 \lambda + \frac{45}{2} \frac{V_{\alpha}}{r^5} B^2 \cos^2 \varphi \cos^3 \lambda \right)$$

$$+ \left(\frac{9}{2} \frac{V_{\alpha}}{r^5} C^2 - \frac{45}{2} \frac{V_{\beta}}{r^5} C^2 \cos^2 \varphi \right) \sin \lambda + \left(\frac{3}{2} \frac{V_{\beta}}{r^5} C^2 + 15 \frac{V_{\alpha}}{r^5} C^2 \cos^2 \varphi \right) \cos \lambda$$

$$+ \frac{15}{4} \frac{V_{\alpha}}{r^5} C^2 \sin 2\varphi \sin 2\lambda + \frac{45}{2} \frac{V_{\beta}}{r^5} C^2 \cos^2 \varphi \sin^3 \lambda - \frac{45}{2} \frac{V_{\alpha}}{r^5} C^2 \cos^2 \varphi \cos^3 \lambda$$

$$+ \left(3 \frac{V_{\alpha}}{r^5} AB - 15 \frac{V_{\beta}}{r^5} AB \sin^2 \varphi \right) \cos \lambda - \frac{15}{2} \frac{V_{\beta}}{r^5} AB \sin 2\varphi \sin 2\lambda + \frac{15}{2} \frac{V_{\alpha}}{r^5} AB \sin 2\varphi \cos 2\lambda$$

$$+ \left(3 \frac{V_{\beta}}{r^5} BC + 30 \frac{V_{\alpha}}{r^5} BC \cos^2 \varphi \right) \sin \lambda + \left(3 \frac{V_{\alpha}}{r^5} BC + 30 \frac{V_{\beta}}{r^5} BC \cos^2 \varphi \right) \cos \lambda$$

$$+ \frac{15}{2} \frac{V_{\alpha}}{r^5} BC \sin 2\varphi \cos 2\lambda - 45 \frac{V_{\beta}}{r^5} BC \cos^2 \varphi \sin^3 \lambda - 45 \frac{V_{\alpha}}{r^5} BC \cos^2 \varphi \cos^3 \lambda$$

$$+ \left(3 \frac{V_{\alpha}}{r^5} AC - 15 \frac{V_{\beta}}{r^5} AC \sin^2 \varphi \right) \sin \lambda + \frac{15}{2} \frac{V_{\beta}}{r^5} AC \sin 2\varphi \sin 2\lambda$$

$$+ \frac{15}{2} \frac{V_{\alpha}}{r^5} AC \sin 2\varphi \cos 2\lambda$$

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$\Sigma X_{n>4}$

$$\frac{1}{n} \Sigma X = -\mu_a \cos \varphi - (h + \frac{1}{2}) \sin 2\varphi - 6(2E + Hl) \cos \varphi + \frac{15}{2}(2E + Hl) \cos^2 \varphi$$

$$\frac{1}{n} \Sigma X \sin \lambda = +\frac{1}{2} \mu_b \sin \varphi - \frac{1}{2} e \cos 2\varphi + \frac{11}{8}(4J + 3F) \sin \varphi - \frac{15}{8}(4J + 3F) \sin^2 \varphi$$

$$\frac{1}{n} \Sigma X \cos \lambda = -\frac{1}{2} \mu_c \sin \varphi + \frac{1}{2} g \cos 2\varphi + \frac{11}{8}(4K + 3G) \sin \varphi - \frac{15}{8}(4K + 3G) \sin^2 \varphi$$

$$\frac{1}{n} \Sigma X \sin 2\lambda = -\frac{1}{4} f \sin 2\varphi - 5L \cos \varphi + \frac{15}{2} L \cos^2 \varphi$$

$$\frac{1}{n} \Sigma X \cos 2\lambda = -\frac{1}{4} i \sin 2\varphi - \frac{5}{2} H \cos \varphi + \frac{15}{4} H \cos^2 \varphi$$

$$\frac{1}{n} \Sigma X \sin^2 \lambda = +\frac{3}{8} \mu_b \sin \varphi - \frac{3}{8} e \cos 2\varphi + \frac{3}{16}(22J + 19F) \sin \varphi - \frac{15}{16}(6J + 5F) \sin^2 \varphi$$

$$\frac{1}{n} \Sigma X \cos^2 \lambda = -\frac{3}{8} \mu_c \sin \varphi + \frac{3}{8} g \cos 2\varphi + \frac{3}{16}(22K + 19G) \sin \varphi - \frac{15}{16}(6K + 5G) \sin^2 \varphi$$

$$\frac{1}{n} \sum y = 0$$

$$\frac{1}{n} \sum y \sin \lambda = -\frac{1}{2} \mu_c - \frac{1}{2} g \sin \varphi - \frac{1}{2} (4K + 3G) + \frac{15}{8} (4K + 3G) \cos^2 \varphi$$

$$\frac{1}{n} \sum y \cos \lambda = -\frac{1}{2} \mu_b - \frac{1}{2} e \sin \varphi + \frac{1}{2} (4J + 3F) - \frac{15}{8} (4J + 3F) \cos^2 \varphi$$

$$\frac{1}{n} \sum y \sin^2 \lambda = -\frac{1}{2} i \cos \varphi - \frac{5}{4} h \sin 2\varphi$$

$$\frac{1}{n} \sum y \cos^2 \lambda = +\frac{1}{2} f \cos \varphi + \frac{5}{2} l \sin 2\varphi$$

$$\frac{1}{n} \sum y \sin^3 \lambda = -\frac{3}{8} \mu_c - \frac{3}{8} g \sin \varphi - \frac{3}{8} (4K + 3G) + \frac{15}{16} (2K + G) \cos^2 \varphi$$

$$\frac{1}{n} \sum y \cos^3 \lambda = -\frac{3}{8} \mu_b - \frac{3}{8} e \sin \varphi + \frac{3}{8} (4J + 3F) - \frac{15}{16} (2J + F) \cos^2 \varphi$$

$$\frac{1}{n} \sum Z = -2\mu_a \sin \varphi - (2h+i) + \frac{3}{2}(2h+i) \cos^2 \varphi + \\ + 6(2\varepsilon+ll) \sin \varphi - 10(2\varepsilon+ll) \sin^2 \varphi$$

$$\frac{1}{n} \sum Z_{\sin \alpha} = -\mu_b \cos \varphi - \frac{3}{4}e \sin 2\varphi + \\ + 2(4J+3F) \cos \varphi - \frac{5}{2}(4J+3F) \cos^2 \varphi$$

$$\frac{1}{n} \sum Z_{\cos \alpha} = +\mu_c \cos \varphi + \frac{3}{4}g \sin 2\varphi + \\ + 2(4K+3S) \cos \varphi - \frac{5}{2}(4K+3S) \cos^2 \varphi$$

$$\frac{1}{n} \sum Z_{\sin \alpha} = +\frac{2}{4}f \cos^2 \varphi + \\ + 10L \sin \varphi - 10L \sin^2 \varphi$$

$$\frac{1}{n} \sum Z_{\cos \alpha} = +\frac{3}{4}i \cos^2 \varphi + \\ + 5H \sin \varphi - 5H \sin^2 \varphi$$

$$\frac{1}{n} \sum Z_{\sin^2 \alpha} = -\frac{3}{4}\mu_b \cos \varphi - \frac{9}{16}e \sin 2\varphi + \\ + \frac{3}{2}(4J+3F) \cos \varphi - \frac{5}{4}(6J+5F) \cos^3 \varphi$$

$$\frac{1}{n} \sum Z_{\cos^2 \alpha} = +\frac{3}{4}\mu_c \cos \varphi + \frac{9}{16}g \sin 2\varphi + \\ + \frac{3}{2}(4K+3S) \cos \varphi - \frac{5}{4}(6K+5S) \cos^3 \varphi$$

$$\frac{\partial X_1}{\partial \varphi} = \mu_a \sin \varphi + (\mu_b \sin d - \mu_c \cos d) \cos \varphi + 2(e \sin d - g \cos d) \sin 2\varphi - (f \sin d + i \cos d) \cos 2\varphi - (i + 2h) \cos 2\varphi$$

$$\frac{\partial X_2}{\partial \varphi} = +(\mu_b \cos d + \mu_c \sin d) \sin \varphi - (e \cos d + g \sin d) \cos \varphi + (i \sin d - f \cos d) \sin 2\varphi$$

$$\frac{\partial Y_1}{\partial \varphi} = -(e \cos d + g \sin d) \cos \varphi + (i \sin d - f \cos d) \sin \varphi$$

$$\frac{\partial Y_2}{\partial \varphi} = (\mu_b \sin d - \mu_c \cos d) + (e \sin d - g \cos d) \sin \varphi - 2(f \sin d + i \cos d) \cos \varphi$$

$$\frac{\partial Z_1}{\partial \varphi} = -2\mu_a \cos \varphi + 2(\mu_b \sin d - \mu_c \cos d) \sin \varphi - 3(e \sin d - g \cos d) \cos 2\varphi - \frac{3}{2}(f \sin d + i \cos d) \sin 2\varphi - \frac{3}{2}(i + 2h) \sin 2\varphi$$

$$\frac{\partial Z_2}{\partial \varphi} = -2(\mu_b \cos d + \mu_c \sin d) \cos \varphi - \frac{3}{2}(e \cos d + g \sin d) \sin 2\varphi - 3(i \sin d - f \cos d) \cos 2\varphi$$

$$\left(\frac{\partial X_t}{\partial \varphi} - \frac{\partial X_s}{\partial \varphi}\right) + \left(\frac{\partial X_t}{\partial r} - \frac{\partial X_s}{\partial r}\right) \frac{t_y}{\cos \varphi} \delta = 0 \quad \dots \quad \left(\frac{\partial X_t}{\partial \varphi} - \frac{\partial X_s}{\partial \varphi}\right) = \frac{\partial \xi}{\partial \varphi}$$

$$\left(\frac{\partial Y_t}{\partial \varphi} - \frac{\partial Y_s}{\partial \varphi}\right) + \left(\frac{\partial Y_t}{\partial r} - \frac{\partial Y_s}{\partial r}\right) \frac{t_y}{\cos \varphi} \delta = 0$$

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$$\left(\frac{\partial Z_t}{\partial \varphi} - \frac{\partial Z_s}{\partial \varphi}\right) + \left(\frac{\partial Z_t}{\partial r} - \frac{\partial Z_s}{\partial r}\right) \frac{t_y}{\cos \varphi} \delta = 0$$

$$\frac{\partial \xi}{\partial r} + \eta \sin \varphi = \frac{\partial \eta}{\partial \varphi} \cos \varphi$$

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$$= \cos \varphi \frac{\partial \eta}{\partial \varphi} - \frac{\partial \eta}{\partial r} t_y \delta - \eta \sin \varphi t_y \delta = 0 \quad \text{♣}$$

$n > 4$.

$$\frac{1}{n} \sum X = -\mu_a \cos \varphi - \left(h + \frac{i}{2}\right) \sin 2\varphi - \\ - 6(2\varepsilon + \mathcal{H}) \cos \varphi + \frac{15}{2}(2\varepsilon + \mathcal{H}) \cos^3 \varphi.$$

$$\frac{1}{n} \sum X \sin \nu = \frac{1}{2} \mu_b \sin \varphi - \frac{1}{2} l \cos 2\varphi + \\ + \frac{11}{8}(4\mathcal{F} + 3\mathcal{F}) \sin \varphi - \frac{15}{8}(4\mathcal{F} + 3\mathcal{F}) \sin^3 \varphi$$

$$\frac{1}{n} \sum X \cos \nu = -\frac{1}{2} \mu_c \sin \varphi + \frac{1}{2} g \cos 2\varphi + \\ + \frac{11}{8}(4\mathcal{K} + 3\mathcal{G}) \sin \varphi - \frac{15}{8}(4\mathcal{K} + 3\mathcal{G}) \sin^3 \varphi$$

$$\frac{1}{n} \sum X \sin 2\nu = -\frac{1}{4} f \sin 2\varphi - \\ - 5d \cos \varphi + \frac{15}{2} \mathcal{L} \cos^3 \varphi.$$

$$\frac{1}{n} \sum X \cos 2\nu = -\frac{1}{4} i \sin 2\varphi - \\ - \frac{5}{2} \mathcal{H} \cos \varphi + \frac{15}{4} \mathcal{H} \cos^3 \varphi$$

$$\frac{1}{n} \sum X \sin^3 \nu = +\frac{3}{8} \mu_b \sin \varphi - \frac{3}{8} c \cos 2\varphi + \\ + \frac{3}{16}(22\mathcal{F} + 19\mathcal{F}) \sin \varphi - \frac{15}{16}(6\mathcal{F} + 5\mathcal{F}) \sin^3 \varphi$$

$$\frac{1}{n} \sum X \cos^3 \nu = -\frac{3}{8} \mu_c \sin \varphi + \frac{3}{8} g \cos 2\varphi + \\ + \frac{3}{16}(22\mathcal{K} + 19\mathcal{G}) \sin \varphi - \frac{15}{16}(6\mathcal{K} + 5\mathcal{G}) \sin^3 \varphi.$$

$$\underline{\frac{1}{n} \sum y} = 0$$

$$\underline{\frac{1}{n} \sum y \sin \lambda} = -\frac{1}{2} \mu_c - \frac{1}{2} g \sin \varphi \\ - \frac{1}{2} (4K + 3G) + \frac{15}{8} (4K + 3G) \cos^2 \varphi$$

$$\underline{\frac{1}{n} \sum y \cos \lambda} = -\frac{1}{2} \mu_b - \frac{1}{2} l \sin \varphi \\ + \frac{1}{2} (4F + 3F) - \frac{15}{8} (4F + 3F) \cos^2 \varphi.$$

$$\underline{\frac{1}{n} \sum y \sin 2\lambda} = -\frac{1}{2} i \cos \varphi \\ - \frac{5}{4} H \sin 2\varphi$$

$$\underline{\frac{1}{n} \sum y \cos 2\lambda} = +\frac{1}{2} f \cos \varphi \\ + \frac{5}{2} L \sin 2\varphi$$

$$\underline{\frac{1}{n} \sum y \sin^3 \lambda} = -\frac{3}{8} \mu_c - \frac{3}{8} g \sin \varphi \\ - \frac{3}{8} (4K + 3G) + \frac{15}{16} (2K + G) \cos^2 \varphi$$

$$\underline{\frac{1}{n} \sum y \cos^3 \lambda} = -\frac{3}{8} \mu_b - \frac{3}{8} l \sin \varphi \\ + \frac{3}{8} (4F + 3F) - \frac{15}{16} (2F + F) \cos^2 \varphi.$$

$$\begin{aligned} \underline{\frac{1}{n} \sum \tilde{Z}} &= -2\mu_a \sin \varphi - (2h+i) + \frac{3}{2}(2h+i) \cos^2 \varphi \\ &+ 6(2\varepsilon + \mathcal{H}) \sin \varphi - 10(2\varepsilon + \mathcal{H}) \sin^3 \varphi \end{aligned}$$

$$\begin{aligned} \underline{\frac{1}{n} \sum \tilde{Z} \sin \lambda} &= -\mu_b \cos \varphi - \frac{3}{4} e \sin 2\varphi \\ &+ 2(4\mathcal{F} + 3\mathcal{F}) \cos \varphi - \frac{5}{2}(4\mathcal{F} + 3\mathcal{F}) \cos^3 \varphi \end{aligned}$$

$$\begin{aligned} \underline{\frac{1}{n} \sum \tilde{Z} \cos \lambda} &= +\mu_c \cos \varphi + \frac{3}{4} g \sin 2\varphi \\ &+ 2(4\mathcal{K} + 3\mathcal{G}) \cos \varphi - \frac{5}{2}(4\mathcal{K} + 3\mathcal{G}) \cos^3 \varphi \end{aligned}$$

$$\begin{aligned} \underline{\frac{1}{n} \sum \tilde{Z} \sin 2\lambda} &= +\frac{3}{4} f \cos^2 \varphi \\ &+ 10\mathcal{L} \sin \varphi - 10\mathcal{L} \sin^3 \varphi \end{aligned}$$

$$\begin{aligned} \underline{\frac{1}{n} \sum \tilde{Z} \cos 2\lambda} &= +\frac{3}{4} i \cos^2 \varphi \\ &+ 5\mathcal{H} \sin \varphi - 5\mathcal{H} \sin^3 \varphi. \end{aligned}$$

$$\begin{aligned} \underline{\frac{1}{n} \sum \tilde{Z} \sin^3 \lambda} &= -\frac{3}{4} \mu_b \cos \varphi - \frac{9}{16} e \sin 2\varphi \\ &+ \frac{3}{2}(4\mathcal{F} + 3\mathcal{F}) \cos \varphi - \frac{5}{4}(6\mathcal{F} + 5\mathcal{F}) \cos^3 \varphi \end{aligned}$$

$$\begin{aligned} \underline{\frac{1}{n} \sum \tilde{Z} \cos^3 \lambda} &= +\frac{3}{4} \mu_c \cos \varphi + \frac{9}{16} g \sin 2\varphi + \\ &+ \frac{3}{2}(4\mathcal{K} + 3\mathcal{G}) \cos \varphi - \frac{5}{4}(6\mathcal{K} + 5\mathcal{G}) \cos^3 \varphi \end{aligned}$$

$$\begin{aligned}
y = & -\frac{V_1}{r^3} \sin \lambda - \frac{V_2}{r^3} \cos \lambda - \\
& - 3 \frac{V_1}{r^4} a_0 \sin \varphi \sin \lambda - 3 \frac{V_2}{r^4} a_0 \sin \varphi \cos \lambda - \\
& - 3 \frac{V_1}{r^4} b_0 \sin \varphi \cos \lambda - 3 \frac{V_2}{r^4} b_0 \cos \varphi \sin 2\lambda + 3 \frac{V_1}{r^4} b_0 \cos \varphi \cos 2\lambda - \\
& - 3 \frac{V_1}{r^4} c_0 \sin \varphi \sin \lambda + 3 \frac{V_2}{r^4} c_0 \cos \varphi \sin 2\lambda + 3 \frac{V_1}{r^4} c_0 \cos \varphi \cos 2\lambda + \\
& + \left(\frac{3}{2} \frac{V_1}{r^5} A^2 - \frac{15}{2} \frac{V_1}{r^5} A^2 \sin^2 \varphi \right) \sin \lambda + \left(\frac{3}{2} \frac{V_2}{r^5} A^2 - \frac{15}{2} \frac{V_2}{r^5} A^2 \sin^2 \varphi \right) \cos \lambda + \\
& + \left(\frac{3}{2} \frac{V_1}{r^5} B^2 + 15 \frac{V_1}{r^5} B^2 \cos^2 \varphi \right) \sin \lambda + \left(\frac{9}{2} \frac{V_2}{r^5} B^2 - \frac{45}{2} \frac{V_2}{r^5} B^2 \cos^2 \varphi \right) \cos \lambda - \\
& - \frac{15}{4} \frac{V_1}{r^5} B^2 \sin 2\varphi \sin 2\lambda - \frac{45}{2} \frac{V_1}{r^5} B^2 \cos^2 \varphi \sin^3 \lambda + \frac{45}{2} \frac{V_2}{r^5} B^2 \cos^2 \varphi \cos^3 \lambda \\
& + \left(\frac{9}{2} \frac{V_1}{r^5} C^2 - \frac{45}{2} \frac{V_1}{r^5} C^2 \cos^2 \varphi \right) \sin \lambda + \left(\frac{3}{2} \frac{V_2}{r^5} C^2 + 15 \frac{V_2}{r^5} C^2 \cos^2 \varphi \right) \cos \lambda + \\
& + \frac{15}{4} \frac{V_1}{r^5} C^2 \sin 2\varphi \sin 2\lambda + \frac{45}{2} \frac{V_1}{r^5} C^2 \cos^2 \varphi \sin^3 \lambda - \frac{45}{2} \frac{V_2}{r^5} C^2 \cos^2 \varphi \cos^3 \lambda + \\
& + \left(3 \frac{V_1}{r^5} AB - 15 \frac{V_1}{r^5} AB \sin^2 \varphi \right) \cos \lambda - \frac{15}{2} \frac{V_2}{r^5} AB \sin 2\varphi \sin 2\lambda + \frac{15}{2} \frac{V_1}{r^5} AB \sin 2\varphi \cos 2\lambda \\
& + \left(3 \frac{V_2}{r^5} B\ell + 30 \frac{V_1}{r^5} B\ell \cos^2 \varphi \right) \sin \lambda + \left(3 \frac{V_1}{r^5} B\ell + 30 \frac{V_2}{r^5} B\ell \cos^2 \varphi \right) \cos \lambda + \\
& + \frac{15}{2} \frac{V_1}{r^5} B\ell \sin 2\varphi \cos 2\lambda - 45 \frac{V_2}{r^5} B\ell \cos^2 \varphi \sin^3 \lambda - 45 \frac{V_1}{r^5} B\ell \cos^2 \varphi \cos^3 \lambda \\
& + \left(3 \frac{V_1}{r^5} A\ell - 15 \frac{V_1}{r^5} A\ell \sin^2 \varphi \right) \sin \lambda + \frac{15}{2} \frac{V_2}{r^5} A\ell \sin 2\varphi \sin 2\lambda + \\
& + \frac{15}{2} \frac{V_2}{r^5} A\ell \sin 2\varphi \cos 2\lambda
\end{aligned}$$

$$\begin{aligned}
\underline{X)} & + \frac{3}{2} \cos \varphi \left[(3\alpha A^2 - 4\alpha B^2 + \alpha C^2 - 8\beta AB + 2\gamma AC) - 15(\alpha A^2 - \alpha B^2 - 2\beta AB) \right] \\
& + \frac{4\sqrt{5}}{2} \cos^3 \varphi (\alpha A^2 - \alpha B^2 - 2\beta AB) \\
& + \frac{3}{2} \sin \varphi \sin \lambda \left[(4\beta A^2 - 3\beta B^2 - \beta C^2 + 8\alpha AB - 2\gamma BC) - 15(\beta A^2 - \beta C^2 + 2\alpha AB - 2\gamma BC) \right] \\
& + \frac{4\sqrt{5}}{2} \sin^3 \varphi \sin \lambda (\beta A^2 - \beta C^2 + 2\alpha AB - 2\gamma BC) \\
& - \frac{3}{2} \sin \varphi \cos \lambda \left[(4\gamma A^2 - \gamma B^2 - 3\gamma C^2 - 2\beta BC + 8\alpha AC) - 15(\gamma A^2 - \gamma B^2 - 2\beta BC + 2\alpha AC) \right] \\
& - \frac{4\sqrt{5}}{2} \sin^3 \varphi \cos \lambda (\gamma A^2 - \gamma B^2 - 2\beta BC + 2\alpha AC) \\
& - 15(\cos \varphi - \frac{3}{2} \cos^3 \varphi) \sin 2\lambda (\gamma AB + \alpha BC + \beta AC) \\
& - 15(\cos \varphi - \frac{3}{2} \cos^3 \varphi) \cos^2 \lambda (\alpha B^2 - \alpha C^2 + 2\beta AB - 2\gamma AC) \\
& + \frac{4\sqrt{5}}{2} (\sin \varphi - \sin^3 \varphi) \sin^2 \lambda (\beta B^2 - \beta C^2 - 2\gamma BC) \\
& + \frac{4\sqrt{5}}{2} (\sin \varphi - \sin^3 \varphi) \cos^2 \lambda (\gamma B^2 - \gamma C^2 + 2\beta BC)
\end{aligned}$$

$$\begin{aligned}
& \left(\begin{array}{l} 3b - 3k - 15b \\ -12b \end{array} \right) \\
& -4\gamma - 3\beta + 15\gamma \\
& + 11\gamma - 3\beta
\end{aligned}$$

$$\left(\begin{array}{l} 11k + 3\gamma - 15\beta \\ -12k \end{array} \right)$$

$$-(3\gamma - 11k) \sin \varphi$$

$$\left[(11k - 3\gamma) \sin \varphi - 15\beta (\sin \varphi) \right] \cos \lambda$$

$$\left[\begin{array}{l} 11\gamma - 3\beta \\ -15\sin \varphi \end{array} \right] \sin \lambda$$

Z.

$$\begin{aligned} & 6 \sin \varphi (3\alpha A^2 - 4\alpha B^2 + \alpha C^2 - 8\beta AB + 2\gamma AC) - \\ & - 30 \sin^3 \varphi (\alpha A^2 - \alpha B^2 - 2\beta AB) - \\ & - 6 \cos \varphi \sin \nu (4\beta A^2 - 3\beta B^2 - \beta C^2 + 8\alpha AB - 2\gamma BC) + \\ & + 30 \cos^3 \varphi \sin \nu (\beta A^2 - \beta C^2 + 2\alpha AB - 2\gamma BC) + \\ & + 6 \cos \varphi \cos \nu (4\gamma A^2 - \gamma B^2 - 3\gamma C^2 - 2\beta BC + 8\alpha AC) - \\ & - 30 \cos^3 \varphi \cos \nu (\gamma A^2 - \gamma B^2 - 2\beta BC + 2\alpha AC) + \\ & + 30 (\sin \varphi - \sin^3 \varphi) \sin 2\nu (\gamma AB + \alpha BC + \beta AC) + \\ & + 30 (\sin \varphi - \sin^3 \varphi) \cos^2 \nu (\alpha B^2 - \alpha C^2 + 2\beta AB - 2\gamma AC) - \\ & - 30 \cos^3 \varphi \sin^3 \nu (\beta B^2 - \beta C^2 - 2\gamma BC) \\ & - 30 \cos^3 \varphi \cos^3 \nu (\gamma B^2 - \gamma C^2 + 2\beta BC) \end{aligned}$$

Y

$$\begin{aligned} & - \frac{15}{2} \sin 2\varphi (\gamma AB + \alpha BC + \beta AC) - \\ & - \frac{3}{2} \sin \nu (4\gamma A^2 - \gamma B^2 - 3\gamma C^2 - 2\beta BC + 8\alpha AC) + = (4K + 3B) \\ & + \frac{15}{2} \cos^2 \varphi \sin \nu (\gamma A^2 + 2\gamma B^2 - 3\gamma C^2 + 4\beta BC + 2\alpha AC) - = (K + 5B) \\ & - \frac{3}{2} \cos \nu (4\beta A^2 - 3\beta B^2 - \beta C^2 + 8\alpha AB - 2\gamma BC) + \\ & + \frac{15}{2} \cos^2 \varphi \cos \nu (\beta A^2 - 3\beta B^2 + 2\beta C^2 + 2\alpha AB + 4\gamma BC) - \\ & - \frac{15}{4} \sin 2\varphi \sin 2\nu (\alpha B^2 - \alpha C^2 + 2\beta AB - 2\gamma AC) + \\ & + 15 \sin 2\varphi \cos^2 \nu (\gamma AB + \alpha BC + \beta AC) - \\ & - \frac{45}{2} \cos^2 \varphi \sin^3 \nu (\gamma B^2 - \gamma C^2 + 2\beta BC) + \\ & + \frac{45}{2} \cos^2 \varphi \cos^3 \nu (\beta B^2 - \beta C^2 - 2\gamma BC) \end{aligned}$$

$$X = +0,3178 \cos \varphi \mp 0,0662 \cos(293,5 - \lambda) \sin \varphi - 0,0049 \cos(176,2 - \lambda) \cos(293,5 - \lambda) \sin 2\varphi \\ - 0,0149 \sin 2\varphi - 0,0001 \cos(293,5 - \lambda) \cos 2\varphi + 0,0566 \cos(176,2 - \lambda) \cos 2\varphi.$$

$$Y = +0,0662 \sin(293,5 - \lambda) - 0,0031 \sin(293,5 - \lambda) \sin \varphi + 0,0566 \sin(176,2 - \lambda) \sin \varphi \\ + 0,0049 \sin(109,7 - 2\lambda) \cos \varphi.$$

So

$$Y = (-0,0265 + 0,0577 \sin \varphi) \sin \lambda + (-0,0607 + 0,0065 \sin \varphi) \cos \lambda \\ \mp 0,0017 \cos \varphi \sin 2\lambda \mp 0,0047 \cos \varphi \cos 2\lambda.$$

~~$$X = (+0,3178 \cos \varphi - 0,0149 \sin 2\varphi) + (+0,0662 \sin 293,5 \sin \varphi$$~~

$$X = \left[+0,3178 \cos \varphi - 0,0149 \sin 2\varphi - 0,0049 \sin 176,2 \sin 293,5 \sin 2\varphi \right] \\ \left[\mp 0,0662 \sin 293,5 \sin \varphi - 0,0001 \sin 293,5 \cos 2\varphi + 0,0566 \sin 176,2 \cos 2\varphi \right] \sin \lambda \\ \left[\mp 0,0662 \cos 293,5 \sin \varphi - 0,0031 \cos 293,5 \cos 2\varphi + 0,0566 \cos 176,2 \cos 2\varphi \right] \cos \lambda \\ - 0,0049 \cos 109,7 \sin 2\varphi \cos^2 \lambda \\ - 0,0025 \sin 109,7 \sin 2\varphi \sin 2\lambda$$

$$X = \left[+0,3178 \cos \varphi - 0,0146 \sin 2\varphi \right] + \left[\mp 0,0607 \sin \varphi + 0,0066 \cos 2\varphi \right] \sin \lambda \\ \left[\mp 0,0264 \sin \varphi - 0,0577 \cos 2\varphi \right] \cos \lambda + 0,0016 \sin 2\varphi \cos^2 \lambda \\ - 0,0024 \sin 2\varphi \sin 2\lambda.$$

$$Z = +0,1323 \cos(293,5 - \lambda) \cos \varphi + 0,6356 \sin \varphi - 0,0118 \cos(176,2 - 293,5) \\ + 0,0298 + 0,0447 \cos^2 \varphi + 0,0354 \cos(176,2 - \lambda) \cos(293,5 - \lambda) \cos^2 \varphi \\ - 0,0047 \cos(293,5 - \lambda) \sin 2\varphi + 0,0849 \cos(176,2 - \lambda) \sin 2\varphi.$$

$$Z = \left[-0,0244 + 0,0426 \cos^2 \varphi + 0,6356 \sin \varphi \right] + \left[0,1323 \sin 293,5 \cos \varphi - 0,0047 \sin 293,5 \sin 2\varphi + \right. \\ \left. + 0,0849 \sin 176,2 \sin 2\varphi \right] \sin \lambda + \left[0,1323 \cos 293,5 \cos \varphi - 0,0047 \cos 293,5 \sin 2\varphi + \right. \\ \left. + 0,0849 \cos 176,2 \sin 2\varphi \right] \cos \lambda + 0,0354 \cos 109,7 \cos^2 \varphi + 0,0177 \sin 109,7 \cos^2 \varphi \sin 2\lambda.$$

$$Z = \left[-0,0244 + 0,0426 \cos^2 \varphi + 0,6356 \sin \varphi \right] + \left[-0,1213 \cos \varphi + 0,0099 \sin 2\varphi \right] \sin \lambda \\ \left[+0,0527 \cos \varphi - 0,0866 \sin 2\varphi \right] \cos \lambda - 0,0119 \cos^2 \varphi \cos \lambda + 0,0167 \cos^2 \varphi \sin 2\lambda.$$

$$\sum \sum Z = \left(g n \frac{m l}{r^4} \sum \cos^2 \varphi - 6 n v \frac{m l}{r^4} \right) \sin \varphi_{\tau} \sin \varphi_0$$

$$\rightarrow \left(g \frac{n}{2} \frac{m l}{r^4} \sum \cos^2 \varphi + 3 n v \frac{m l}{r^4} \right) \cos \varphi_0 \cos \varphi_{\tau} \cos (\lambda_0 - \lambda_{\tau})$$

$$\sum \sum Z = N \frac{L}{r} \sin \varphi_{\tau} \sin \varphi_0 - \frac{N L}{2 r} \cos \varphi_0 \cos \varphi_{\tau} \cos \lambda_{\tau} \cos \lambda_0 - \frac{L N}{r^2} \cos \varphi_0 \cos \varphi_{\tau} \sin^2 \lambda_{\tau} \cos \lambda_0$$

$$\frac{\sum \sum X \sin \lambda}{\sum \cos \varphi} \cdot \frac{2}{3 n \frac{m}{r^3}} + \cos \varphi_{\tau} \sin \lambda_{\tau} \frac{L}{r} \sin \varphi_0 = - \frac{L}{r} \sin \varphi_{\tau} \cos \varphi_0 \sin \lambda_0$$

$$\frac{\sum \sum X \cos \lambda}{\sum \cos \varphi} \cdot \frac{2}{3 n \frac{m}{r^3}} + \cos \varphi_{\tau} \cos \lambda_{\tau} \frac{L}{r} \sin \varphi_0 = - \frac{L}{r} \sin \varphi_{\tau} \cos \varphi_0 \cos \lambda_0$$

$$\sum \sum Z = N \sin \varphi_{\tau} \left(\frac{L}{r} \sin \varphi_0 + \frac{N \cos \varphi_{\tau}}{2 \sin \varphi_{\tau}} \frac{\sum \sum X \sin \lambda}{\sum \cos \varphi} \cdot \frac{2 \cos \lambda_{\tau}}{3 n \frac{m}{r^3}} + \frac{\cos \varphi_{\tau} \cos \varphi_{\tau} \cos \lambda_{\tau}}{\sin \varphi_{\tau}} \frac{L}{r} \sin \varphi_0 \right)$$

&

$$+ \frac{N \cos \varphi_{\tau}}{2 \sin \varphi_{\tau}} \frac{\sum \sum X \cos \lambda}{\sum \cos \varphi} \cdot \frac{2 \sin \lambda_{\tau}}{3 n \frac{m}{r^3}} + \frac{\cos \varphi_{\tau} \cos \varphi_{\tau} \sin^2 \lambda_{\tau}}{\sin \varphi_{\tau}} \frac{L}{r} \sin \varphi_0$$

~~N = 91,97~~ $N = 91,97$

$$\sum \cos^2 \varphi = 3,9408$$

$$\sum \cos \varphi = 2,8792$$

$$\frac{N}{\sum \cos \varphi \cdot 3 n \frac{m}{r^3}} = 0,6334$$

$$\frac{\cos \varphi_{\tau}}{\sin \varphi_{\tau}} = + 0,2087$$

$$\cos \lambda_{\tau} = 0,1590$$

$$\sin^2 \lambda_{\tau} = 0,8410$$

$$+ 0,39 = - 31,30 \frac{L}{r} \sin \varphi_0 - 0,0783 - 0,00671 \frac{L}{r} \sin \varphi_0 - 0,0206 - 0,05567 \frac{L}{r} \sin \varphi_0$$

~~+ 0,49~~ $+ 0,49 = - 31,34 \frac{L}{r} \sin \varphi_0$

$$\frac{L}{r} \sin \varphi_0 = - 0,01563$$

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$$- \frac{2 \sum \sum X \sin \lambda}{3 n \frac{m}{r^3} \sum \cos \varphi} = \cos \varphi_{\tau} \sin \lambda_{\tau} \frac{L}{r} \sin \varphi_0 + \sin \varphi_{\tau} \cos \varphi_0 \frac{L}{r} \sin \lambda_0$$

D

$$= \frac{2 \sum \sum X \cos \lambda}{3 n \frac{m}{r^3} \sum \cos \varphi} = \cos \varphi_{\tau} \cos \lambda_{\tau} \frac{L}{r} \sin \varphi_0 + \sin \varphi_{\tau} \cos \varphi_0 \frac{L}{r} \cos \lambda_0$$

$$- 0,006799 = - 0,00292 + \sin \varphi_{\tau} \cos \varphi_0 \frac{L}{r} \sin \lambda_0$$

$$\frac{L}{r} \sin \lambda_0 = - 0,0661 \quad \lambda_0 = 176^{\circ} 15'$$

$$+ 0,05906 = + 0,00127 + \sin \varphi_{\tau} \cos \varphi_0 \frac{L}{r} \cos \lambda_0$$

$$\frac{L}{r} \cos \lambda_0 = 0,06139$$

$$- 0,00382 = - 0,0641 \frac{L}{r} \cos \varphi_0$$

$$\frac{L}{r} \cos \varphi_0 = + 0,05915$$

$$+ 0,05779 = + 0,9771 \frac{L}{r} \cos \varphi_0$$

$$\frac{L}{r} \sin \varphi_0 = - 0,2633$$

$$\varphi_0 = - 14^{\circ} 45'$$

$$\sum (X+X') \sin^2 d = -n \frac{\mu}{r^2} \sin \varphi_0 \cos \varphi$$

$$\sum (X+X') \cos^2 d = -n \frac{\mu}{r^2} \sin \varphi_0 \cos \varphi$$

$$\sum (X+X') \sin 2d = 0$$

$$\sum (X+X') \cos 2d = 0$$

$$\sum (Y+Y') \sin^2 d = +\frac{3}{2} n \frac{\mu l}{r^4} \cos \varphi_0 \cos \varphi_0 \cos(\lambda_0 + \lambda_0) \cos \varphi$$

$$\sum (Y+Y') \cos^2 d = -\frac{3}{2} n \frac{\mu l}{r^4} \cos \varphi_0 \cos \varphi_0 \cos(\lambda_0 + \lambda_0) \cos \varphi$$

$$\sum (Y+Y') \sin 2d = +n \frac{3\mu l}{r^4} \cos \varphi_0 \cos \varphi_0 \cos(\lambda_0 + \lambda_0) \cos \varphi$$

$$\sum (Y+Y') \cos 2d = -n \frac{3\mu l}{r^4} \cos \varphi_0 \cos \varphi_0 \cos(\lambda_0 + \lambda_0) \cos \varphi$$

$$\sum (Z+Z') \sin^2 d = \frac{n}{2} \left[-12 \frac{\mu l}{r^4} \sin \varphi_0 \sin \varphi_0 + 18 \cos^2 \varphi \frac{\mu l}{r^4} \sin \varphi_0 \sin \varphi_0 + 6 \frac{\mu l}{r^4} \cos \varphi_0 \cos \varphi_0 \cos(\lambda_0 - \lambda_0) \right]$$

$$- \frac{18}{8} n \frac{\mu l}{r^4} \cos^2 \varphi \cos \varphi_0 \cos \varphi_0 \cos \lambda_0 \cos \lambda_0$$

$$- \frac{54}{8} n \frac{\mu l}{r^4} \cos^2 \varphi \cos \varphi_0 \cos \varphi_0 \sin \lambda_0 \sin \lambda_0$$

$$\sum (Z+Z') \cos^2 d = \frac{n}{2} \left[-12 \frac{\mu l}{r^4} \sin \varphi_0 \sin \varphi_0 + 18 \cos^2 \varphi \frac{\mu l}{r^4} \sin \varphi_0 \sin \varphi_0 + 6 \frac{\mu l}{r^4} \cos \varphi_0 \cos \varphi_0 \cos(\lambda_0 - \lambda_0) \right]$$

$$- \frac{54}{8} n \frac{\mu l}{r^4} \cos^2 \varphi \cos \varphi_0 \cos \varphi_0 \cos \lambda_0 \cos \lambda_0$$

$$- \frac{18}{8} n \frac{\mu l}{r^4} \cos^2 \varphi \cos \varphi_0 \cos \varphi_0 \sin \lambda_0 \sin \lambda_0$$

$$\sum (Z+Z') \sin 2d = -\frac{9}{8} n \frac{\mu l}{r^4} \cos^2 \varphi \cos \varphi_0 \cos \varphi_0 \sin(\lambda_0 + \lambda_0)$$

$$\sum (Z+Z') \cos 2d = -\frac{36}{8} n \frac{\mu l}{r^4} \cos^2 \varphi \cos \varphi_0 \cos \varphi_0 \cos \lambda_0 \cos \lambda_0$$

$$+ \frac{54}{8} n \frac{\mu l}{r^4} \cos^2 \varphi \cos \varphi_0 \cos \varphi_0 \sin \lambda_0 \sin \lambda_0$$

$$= -\frac{36}{8} n \frac{\mu l}{r^4} \cos^2 \varphi \cos \varphi_0 \cos \varphi_0 \cos(\lambda_0 + \lambda_0)$$

$$\cos^2 d \sin^2 d = \cos^2 d - \cos^4 d$$

$$\frac{n}{2} - \frac{2n}{8}$$

$$\cos^2 d \sin^2 d = \frac{1}{2} \cos^2 d \sin^2 d$$

$$* \sum \sum X = -n \sum \frac{m}{r^3} \sin \varphi_0 \cos \varphi_0 = -n \frac{m}{r^3} \sin \varphi_0 \sum_{-\varphi}^{+\varphi}$$

$$\sum \sum X_{\text{ind}} = -\frac{n}{2} 3 \frac{ml}{r^4} (\sin \varphi_0 \cos \varphi_0 \sin d_0 + \cos \varphi_0 \sin \varphi_0 \sin d_0) \sum \cos 2\varphi$$

$$\sum \sum X_{\text{ind}} = -\frac{n}{2} 3 \frac{ml}{r^4} (\sin \varphi_0 \cos \varphi_0 \cos d_0 + \cos \varphi_0 \sin \varphi_0 \cos d_0) \sum \cos 2\varphi$$

4)

$$* \sum \sum Y = 0$$

$$* \sum \sum Y_{\text{ind}} = \frac{n}{2} v \frac{m}{r^3} \cos \varphi_0 \cos d_0$$

$$d_0 \quad \frac{m}{r^3} \cos \varphi_0$$

$$* \sum \sum Y_{\text{ind}} = -\frac{n}{2} v \frac{m}{r^3} \cos \varphi_0 \sin d_0$$

$$d_0 \quad \varphi_0 \quad \frac{m}{r^3}$$

$$\sum \sum Z = -6n v \frac{ml}{r^4} \sin \varphi_0 \sin \varphi_0 + 9n \frac{ml}{r^4} \sin \varphi_0 \sin \varphi_0 \sum \cos^2 \varphi + 3v n \frac{ml}{r^4} \cos \varphi_0 \cos \varphi_0 \cos d_0$$

$$- 9 \frac{1}{2} \frac{ml}{r^4} \cos \varphi_0 \cos \varphi_0 \cos(d_0 - d_0) \sum \cos^2 \varphi$$

$$< \sum \sum Z_{\text{ind}} = -n \frac{m}{r^3} \cos \varphi_0 \sin d_0 \sum \cos \varphi$$

$$\sum \sum Y_{\text{ind}} \cdot \sum \sum Z_{\text{ind}} = \sum \sum Y_{\text{ind}} \sum \sum Z_{\text{ind}}$$

$$* \sum \sum Z_{\text{ind}} = -n \frac{m}{r^3} \cos \varphi_0 \cos d_0 \sum \cos \varphi$$

$$+ \varphi \text{ re } \begin{matrix} X \\ y \\ z \end{matrix} - \varphi \begin{matrix} X' \\ x' \\ z' \end{matrix} \quad \varphi = 0 \quad \begin{matrix} X_0 \\ y' \\ z' \end{matrix}$$

$$X_0 = -\frac{\mu}{r^3} \sin \varphi_T - \frac{3\mu l}{r^4} (\sin \varphi_0 \cos \varphi_T \cos d_T + \cos \varphi_0 \sin \varphi_T \cos d_0) \cos d \\ - \frac{3\mu l}{r^4} (\sin \varphi_0 \cos \varphi_T \sin d_T + \cos \varphi_0 \sin \varphi_T \sin d_0) \sin d$$

$$y_0 = +\frac{\mu}{r^3} \cos \varphi_0 \cos d_T \sin d - \frac{\mu}{r^3} \cos \varphi_T \sin d_T \cos d + \cos \varphi_0 \cos \varphi_T \cos(d_0 + d_T) \frac{3\mu l}{r^4} (\sin 2d - \cos 2d)$$

$$Z_0 = -\frac{6\mu l}{r^4} \sin \varphi_0 \sin \varphi_T + 9 \frac{\mu l}{r^4} \sin \varphi_0 \sin \varphi_T + 3 \frac{\mu l}{r^4} \cos \varphi_0 \cos \varphi_T \cos(d_0 - d_T) \\ - \frac{2\mu}{r^3} \cos \varphi_T \sin d_T \sin d - \frac{2\mu}{r^3} \cos \varphi_T \cos d_T \cos d \\ - 9 \frac{\mu l}{r^4} \cos \varphi_0 \cos \varphi_T \cos d_0 \cos d_T \cos^2 d \\ - 9 \frac{\mu l}{r^4} \cos \varphi_0 \cos \varphi_T \sin d_0 \sin d_T \sin^2 d \\ - 9 \frac{\mu l}{r^4} \cos \varphi_0 \cos \varphi_T \sin(d_0 + d_T) \sin d \cos d$$

$$X + X' = -2 \frac{\mu}{r^3} \sin \varphi_T \cos \varphi - \frac{6\mu l}{r^4} \cos 2\varphi (\sin \varphi_0 \cos \varphi_T \cos d_T + \cos \varphi_0 \sin \varphi_T \cos d_0) \cos d \\ - \frac{6\mu l}{r^4} \cos 2\varphi (\sin \varphi_0 \cos \varphi_T \sin d_T + \cos \varphi_0 \sin \varphi_T \sin d_0) \sin d$$

$$y + y' = +2 \frac{\mu}{r^3} \cos \varphi_0 \cos d_T \sin d - 2 \frac{\mu}{r^3} \cos \varphi_T \sin d_T \cos d + \cos \varphi_0 \cos \varphi_T \cos(d_0 + d_T) \frac{6\mu l}{r^4} \cos \varphi (\sin 2d - \cos 2d)$$

$$Z + Z' = -12 \frac{\mu l}{r^4} \sin \varphi_0 \sin \varphi_T + 18 \cos^2 \varphi \frac{\mu l}{r^4} \sin \varphi_0 \sin \varphi_T + 6 \frac{\mu l}{r^4} \cos \varphi_0 \cos \varphi_T \cos(d_0 - d_T) \\ - \frac{4\mu}{r^3} \cos \varphi \cos \varphi_T \sin d_T \sin d - \frac{4\mu}{r^3} \cos \varphi \cos \varphi_T \cos d_T \cos d \\ - 18 \frac{\mu l}{r^4} \cos^2 \varphi \cos \varphi_0 \cos \varphi_T \cos d_0 \cos d_T \cos^2 d \\ - 18 \frac{\mu l}{r^4} \cos^2 \varphi \cos \varphi_0 \cos \varphi_T \sin d_0 \sin d_T \sin^2 d \\ - 18 \frac{\mu l}{r^4} \cos^2 \varphi \cos \varphi_0 \cos \varphi_T \sin(d_0 + d_T) \sin d \cos d$$

$$\int_{-\varphi}^{+\varphi} Z \sin \lambda = -18 \cdot \frac{\mu}{r^3} \cos \varphi_C \frac{\sin \lambda_C}{\sin \varphi_C} \cdot 4,42$$

$$2 \text{ re. } \quad \left\{ \begin{array}{l} -4,84 = -79,56 \cdot \cos \varphi_C \frac{\sin \lambda_C}{\sin \varphi_C} \frac{\mu}{r^3} \\ +2,11 = -79,56 \cdot \cos \varphi_C \cos \lambda_C \frac{\mu}{r^3} \end{array} \right. \quad 1)$$

$$4 \text{ min. } \quad \left\{ \begin{array}{l} -1,11 = 45 \cos \varphi_C \cos \lambda_C \frac{\mu}{r^3} \\ -2,57 = -45 \cos \varphi_C \sin \lambda_C \frac{\mu}{r^3} \end{array} \right. \quad 2)$$

$$\sum \sum X \text{ min. } \quad +25,29 = -79,56 \sin \frac{\varphi_C}{\varphi} \frac{\mu}{r^3} \quad 3)$$

$$\begin{array}{l} 1) \text{ elvált } \quad \text{tg } \lambda_C = -2,29 \quad \dots \quad \lambda_C = -66^\circ 30' \quad \text{Kedves } 293^\circ 30' \\ 2) \text{ elvált } \quad \text{tg } \lambda_C = -2,31 \quad \dots \quad \lambda_C = -66^\circ 40' \quad 293^\circ 20' \\ \hline \lambda_C = 293^\circ 30' \text{ a kedves.} \end{array}$$

$$\begin{array}{l} 1) \text{ elvált } \quad 278777 = 6000 \cos^2 \varphi_C \left(\frac{\mu}{r^3}\right)^2 \\ 6395000 = 6000 \sin^2 \varphi_C \left(\frac{\mu}{r^3}\right)^2 \end{array}$$

$$\frac{\mu}{r^3} = 0,3246$$

$$\begin{array}{l} \sin \varphi_C = -0,9791 \\ \cos \varphi_C = -0,2038 \\ \sin \lambda_C = -0,9171 \\ \cos \lambda_C = +0,2987 \end{array}$$

$$3) \text{ min. } \quad \sin \varphi_C = -0,9791 \quad \varphi_C = 258^\circ 16'$$

$$\cos \varphi_C = +0,9671$$

$$\sin \varphi_0 = -0,2546$$

$$\begin{array}{l} 1) \text{ egyenlet } \quad +0,17 = -25,24 \frac{L}{r} (0,1869 \cdot \sin \varphi_0 - 0,9791 \cos \varphi_0 \sin \lambda_0) \\ -1,49 = -25,24 \frac{L}{r} (-0,0813 \sin \varphi_0 - 0,9791 \cos \varphi_0 \cos \lambda_0) \end{array}$$

$$\text{megyris } \quad \left\{ \begin{array}{l} +0,17 = -4,720 \frac{L}{r} \sin \varphi_0 + 24,71 \frac{L}{r} \cos \varphi_0 \sin \lambda_0 \\ -1,49 = +2,052 \frac{L}{r} \sin \varphi_0 + 24,71 \frac{L}{r} \cos \varphi_0 \cos \lambda_0 \end{array} \right.$$

$$\frac{\mu}{r^3} = 0,3246 \quad \varphi_C = 258^\circ 16' \quad \lambda_C = 293^\circ 30'$$

$$\frac{L}{r} = 0,06199 \quad \varphi_0 = -14^\circ 45' \quad \lambda_0 = 176^\circ 15'$$

$$\sin \varphi_0 = -0,2546 \quad \cos \varphi_0 = 0,9671$$

$$3 \int_0^{\varphi} \lambda \cos^2 \varphi + \int_0^{\varphi} 2 \sin 2\varphi +$$

$$\left[3 \int_0^{\varphi} \cos^2 \varphi \left(\sum_{\varphi} \lambda \right) + \int_0^{\varphi} \sin 2\varphi \left(\sum_{\varphi} 2 \right) + 3n \frac{\mu}{r^3} \sin \varphi \tau \int_0^{\varphi} \cos^2 \varphi + 6n \frac{\mu}{r^3} \frac{\sin \varphi \tau}{r} \sin \varphi_0 \int_0^{\varphi} \sin 2\varphi + \right. \\ \left. + n \frac{2\mu}{r^3} \sin \varphi \tau \int_0^{\varphi} \sin \varphi \sin 2\varphi \right] \frac{1}{3n \int_0^{\varphi} \sin 2\varphi} = \frac{\mu l}{r^4} \cos \varphi_0 \cos \varphi \tau \cos(\lambda_0 - \lambda \tau)$$

$$\left[\int_{-\varphi}^{+\varphi} \sum 2 + 6n \nu \frac{\mu}{r^3} \sin \varphi \tau \frac{l}{r} \sin \varphi_0 - 9n \int_{-\varphi}^{+\varphi} \cos^2 \varphi \cdot \frac{\mu}{r^3} \frac{\sin \varphi \tau}{r} \sin \varphi_0 \right] \frac{1}{3\nu n - \frac{9}{2} n \int_{-\varphi}^{+\varphi} \cos^2 \varphi}$$

$$= \frac{\mu l}{r^4} \cos \varphi_0 \cos \varphi \tau \cos(\lambda_0 - \lambda \tau)$$

III Formulák alapján az Asymptot értékeit Dancsics szerint. No 5104/12

$$m_a = -336,75 \quad m_b = \frac{60,2y}{58,1x} = +59,5 \quad m_c = \frac{13,55y}{4,2x} = +8,9$$

$$e = -14,4 \quad f = \frac{26,677}{20,20x} = -28,4 \quad g = -42,0 \quad h = -21,1 \quad i = \frac{-2,727}{-2,552} = -2,6$$

$$X_{III} = (336,8 \cos \varphi + 21,1 \sin 2\varphi) + (59,5 \sin \varphi + 14,4 \cos 2\varphi) \sin \varphi - (8,9 \sin \varphi + 42,0 \cos 2\varphi) \cos \varphi + 14,2 \sin \varphi \sin 2\varphi + 2,6 \sin 2\varphi \cos 2\varphi$$

$\varphi = -60$	+150	-59 sind	+29 cos d	-12 sind	+2 cos ² d
-40	+227	-36 sind	-2 cos d	-14 sind	-3 cos ² d
-20	+303	-9 sind	-30 cos d	-9 sind	+2 cos ² d
0	+337	+21 sind	-42 cos d	0	0
+20	+330	+31 sind	-34 cos d	+9 sind	+2 cos ² d
+40	+279	+41 sind	-13 cos d	+14 sind	+3 cos ² d
+60	+187	+44 sind	+13 cos d	+12 sind	+2 cos ² d

$$Y_{III} = +(-8,9 + 42 \sin \varphi) \sin \varphi + (-59,5 + 14,4 \sin \varphi) \cos \varphi + 2,6 \cos \varphi \sin 2\varphi - 28,4 \cos \varphi \cos 2\varphi$$

$\varphi = -60$		-45 sind	-72 cos d	+1 sind	-14, cos ² d
-40		-36 sind	-69 cos d	+2 sind	-22 cos ² d
-20		-23 sind	-64 cos d	+2 sind	-27 cos ² d
0		-9 sind	-60 cos d	+3 sind	-28 cos ² d
+20		+6 sind	-55 cos d	+2 sind	-27 cos ² d
+40		+18 sind	-50 cos d	+2 sind	-22 cos ² d
+60		+28 sind	-47 cos d	+1 sind	-14 cos ² d

$$Z_{III} = (44,8 - 63,3 \cos^2 \varphi + 673,5 \sin \varphi) + (-119,0 \cos \varphi + 21,6 \sin 2\varphi) \sin \varphi + (17,8 \cos \varphi - 63,0 \sin 2\varphi) \cos \varphi - 42,0 \cos^2 \varphi \sin \varphi - 7,8 \cos^2 \varphi \cos 2\varphi$$

$\varphi = -60$	-554	-78 sind	+64 cos d	-11 sind	-2 cos ² d
-40	-426	-113 sind	+76 cos d	-25 sind	-5 cos ² d
-20	-242	-126 sind	+57 cos d	-57 sind	-7 cos ² d
0	-19	-119 sind	+18 cos d	-42 sind	-8 cos ² d
+20	+219	-98 sind	-24 cos d	-37 sind	-7 cos ² d
+40	+441	-70 sind	-49 cos d	-25 sind	-5 cos ² d
+60	+612	-41 sind	-46 cos d	-11 sind	-2 cos ² d

III. Táblák

4

MAGYAR
TUDOMÁNYOS AKADÉMIA
KÖNYVTÁRA

X	+150	$\varphi = -60$				-	$\varphi = -40$					-20					0			
0	0	+29	0	-2	+177	+237	0	-2	0	-2	+232	+303	0	-20	0	-2	+271	+337	0	-42
10	-10	+29	-4	-2	+163	-	-6	-2	-5	-2	+221	-	-2	-20	-3	-2	+266	-	+4	-41
20	-20	+27	-8	-2	+147		-12	-2	-9	-2	+211		-3	-28	-6	-2	+264		+7	-29
30	-30	+25	-10	-2	+133		-18	-2	-12	-2	+203		-5	-26	-8	-2	+262		+11	-36
40	-38	+22	-12	-1	+121		-23	-2	-14	-2	+196		-6	-23	-9	-1	+264		+14	-32
50	-45	+19	-12	-1	+111		-28	-1	-14	-1	+193		-7	-19	-9	-1	+267		+16	-27
60	-51	+15	-10	-1	+103		-31	-1	-12	-1	+192		-8	-15	-8	-1	+271		+18	-21
70	-55	+10	-8	0	+97		-34	-1	-9	0	+193		-8	-10	-6	0	+279		+20	-14
80	-58	+5	-4	0	+93		-35	0	-5	0	+197		-9	-5	-2	0	+286		+21	-7
90	-59	0	0	0	+91		-36	0	0	0	+201		-9	0	0	0	+294		+21	0
100	-58	-5	+4	0	+91		-35	0	+5	0	+207		-9	+5	+2	0	+202		+21	+7
110	-55	-10	+8	0	+93		-34	+1	+9	0	+213		-8	+10	+6	0	+211		+20	+14
120	-51	-15	+10	-1	+93		-31	+1	+12	-1	+218		-8	+15	+8	-1	+217		+18	+21
130	-45	-19	+12	-1	+97		-28	+	+14	-1	+222		-7	+19	+9	-1	+223		+16	+27
140	-38	-22	+12	-1	+101		-23	+2	+14	-2	+228		-6	+22	+9	-1	+228		+14	+32
150	-30	-25	+10	-2	+103		-18	+2	+12	-2	+231		-5	+26	+8	-2	+230		+11	+26
160	-20	-27	+8	-2	+109		-12	+2	+9	-3	+233		-2	+28	+6	-2	+232		+7	+29
170	-10	-29	+4	-2	+113		-6	+2	+5	-2	+235		-2	+20	+2	-2	+232		+4	+41
180	0	-29	0	-2	+119		0	+2	0	-2	+236		0	+20	0	-2	+231		0	+42
190	+10	-29	-4	-2	+125		+6	+2	-5	-2	+237		+2	+20	-2	-2	+230		-4	+41
200	+20	-27	-8	-2	+133		+12	+2	-9	-2	+239		+2	+28	-6	-2	+226		-7	+29
210	+20	-25	-10	-2	+143		+18	+2	-12	-2	+243		+5	+26	-8	-2	+224		-11	+26
220	+28	-22	-12	-1	+153		+22	+2	-14	-2	+246		+6	+22	-9	-1	+222		-14	+22
230	+45	-19	-12	-1	+163		+28	+1	-14	-1	+251		+7	+19	-9	-1	+219		-16	+27
240	+51	-15	-10	-1	+175		+31	+1	-12	-1	+256		+8	+15	-8	-1	+217		-18	+21
250	+55	-10	-8	0	+187		+34	+1	-9	0	+263		+8	+10	-6	0	+215		-20	+14
260	+58	-5	-4	0	+199		+35	0	-5	0	+267		+9	+5	-2	0	+214		-21	+7
270	+59	0	0	0	+209		+36	0	0	0	+273		+9	0	0	0	+212		-21	0
280	+58	+5	+4	0	+217		+35	0	+5	0	+277		+9	-5	+2	0	+210		-21	-7
290	+55	+10	+8	0	+223		+34	-1	+9	0	+279		+8	-10	+6	0	+211		-20	-14
300	+51	+15	+10	-1	+225		+31	-1	+12	-1	+278		+8	-15	+8	-1	+203		-18	-21
310	+45	+19	+12	-1	+225		+28	-1	+14	-1	+277		+7	-19	+9	-1	+209		-16	-27
320	+38	+22	+12	-1	+221		+23	-2	+14	-2	+270		+6	-22	+9	-1	+204		-14	-32
330	+30	+25	+10	-2	+213		+18	-2	+12	-2	+263		+5	-26	+8	-2	+208		-11	-26
340	+20	+27	+8	-2	+203		+12	-2	+9	-2	+253		+2	-28	+6	-2	+202		-7	-29
350	+10	+29	+4	-2	+191		+6	-2	+5	-2	+243		+2	-30	+2	-2	+206		-4	-41

0					+20					+40					+60						
-42	0	0	+295	+330	0	-24	0	+2	+298	+279	0	-12	0	+3	+269	+187	0	+13	0	+2	+202
-41	0	0	+300		+5	-22	+2	+2	+307		+7	-12	+5	+2	+281		+8	+13	+4	+2	+214
-39	0	0	+305		+11	-22	+6	+2	+317		+14	-12	+9	+2	+293		+15	+12	+8	+2	+224
-36	0	0	+312		+16	-29	+8	+2	+327		+21	-11	+12	+2	+303		+22	+11	+10	+2	+232
-32	0	0	+319		+20	-26	+9	+1	+334		+26	-10	+14	+2	+311		+28	+10	+12	+1	+238
-27	0	0	+326		+24	-22	+9	+1	+342		+21	-8	+14	+1	+317		+24	+8	+12	+1	+242
-21		0	+334		+27	-17	+8	+1	+349		+26	-7	+12	+1	+321		+28	+7	+10	+1	+243
-14		0	+343		+29	-12	+6	0	+353		+29	-4	+9	0	+323		+41	+4	+8	0	+240
-7		0	+351		+31	-6	+2	0	+358		+40	-2	+5	0	+322		+43	+2	+4	0	+236
0		0	+358		+21	0	0	0	+361		+41	0	0	0	+320		+44	0	0	0	+231
+7			+365		+21	+6	-2	0	+364		+40	+2	-5	0	+316		+42	-2	-4	0	+224
+14			+371		+29	+12	-6	0	+365		+29	+4	-9	0	+313		+41	-4	-8	0	+216
+21			+378		+27	+17	-8	+1	+367		+26	+7	-12	+1	+311		+28	-7	-10	+1	+209
+27			+380		+24	+22	-9	+1	+368		+21	+8	-14	+1	+305		+24	-8	-12	+1	+202
+32			+383		+20	+26	-9	+1	+368		+26	+10	-14	+2	+303		+28	-10	-12	+1	+194
+36			+384		+16	+29	-8	+2	+369		+21	+11	-12	+2	+301		+22	-11	-10	+2	+190
+39			+383		+11	+22	-6	+2	+369		+14	+12	-9	+2	+299		+15	-12	-8	+2	+184
+41			+382		+5	+22	-3	+2	+367		+7	+12	-5	+2	+297		+8	-12	-4	+2	+180
+42			+379		0	+24	0	+2	+366		0	+12	0	+2	+295		0	-12	0	+2	+176
+41			+374		-5	+22	+2	+2	+363		-7	+12	+5	+2	+293		-8	-12	+4	+2	+172
+39			+369		-11	+22	+6	+2	+359		-14	+12	+9	+2	+289		-15	-12	+8	+2	+170
+36			+362		-16	+29	+8	+2	+353		-21	+11	+12	+2	+283		-22	-11	+10	+2	+166
+32			+355		-20	+26	+5	+1	+346		-26	+10	+14	+2	+279		-28	-10	+12	+1	+162
+27			+348		-24	+22	+9	+1	+338		-21	+8	+14	+1	+271		-24	-8	+12	+1	+158
+21			+340		-27	+17	+8	+1	+329		-26	+7	+12	+1	+263		-28	-7	+10	+1	+153
+14			+331		-29	+12	+6	0	+319		-29	+4	+9	0	+253		-41	-4	+8	0	+150
+7			+323		-21	+6	+2	0	+308		-40	+2	+5	0	+246		-42	-2	+4	0	+146
0			+316		-21	0	0	0	+299		-41	0	0	0	+238		-44	0	0	0	+143
-7			+309		-21	-6	-2	0	+290		-40	-2	-5	0	+232		-42	+2	-4	0	+142
-14			+303		-29	-12	-6	0	+283		-29	-4	-9	0	+227		-41	+4	-8	0	+142
-21			+298		-27	-17	-8	+1	+279		-26	-7	-12	+1	+225		-38	+7	-10	+1	+147
-27			+294		-24	-22	-9	+1	+276		-21	-8	-14	+1	+227		-24	+8	-12	+1	+150
-32			+291		-20	-26	-9	+1	+276		-26	-10	-14	+2	+231		-28	+10	-12	+1	+158
-36			+290		-16	-29	-8	+2	+279		-21	-12	-12	+2	+237		-22	+11	-10	+2	+168
-39			+291		-11	-22	-6	+2	+283		-14	-12	-9	+2	+247		-15	+12	-8	+2	+179
-41			+292		-5	-23	-2	+2	+294		-7	-13	-5	+2	+257		-8	+13	-4	+2	+190

III Table

y.

y	q = -60					-40					-20					0		
0	0	-72	0	-14	-86	0	-69	0	-22	-91	0	-64	0	-27	-91	0	-60	0
10	-8	-71	0	-13	-92	-6	-68	+1	-21	-94	-4	-63	+1	-25	-91	-2	-59	+1
20	-15	-68	+1	-11	-93	-12	-65	+1	-17	-93	-8	-60	+1	-21	-88	-3	-56	+2
30	-23	-62	+1	-7	-91	-18	-60	+2	-11	-87	-12	-55	+2	-14	-79	-5	-52	+3
40	-29	-55	+1	-2	-85	-23	-53	+2	-4	-78	-15	-49	+2	-5	-67	-6	-46	+3
50	-34	-46	+1	+2	-76	-28	-44	+2	+4	-66	-18	-41	+2	+5	-52	-7	-39	+3
60	-39	-36	+1	+7	-67	-31	-35	+2	+11	-53	-20	-32	+2	+14	-36	-8	-30	+3
70	-42	-25	+1	+11	-55	-34	-24	+1	+17	-40	-22	-22	+1	+21	-22	-8	-21	+2
80	-44	-13	0	+13	-44	-35	-12	+1	+21	-25	-23	-11	+1	+25	-8	-9	-10	+1
90	-45	0	0	+14	-31	-36	0	0	+22	-14	-23	0	0	+27	+4	-9	0	0
100	-44	+13	0	+13	-18	-35	+12	-1	+21	-3	-23	+11	-1	+25	+12	-9	+10	-1
110	-42	+25	+1	+11	-7	-34	+24	-1	+17	+6	-22	+22	-1	+21	+20	-8	+21	-2
120	-39	+36	-1	+7	+3	-31	+35	-2	+11	+13	-20	+32	+2	+14	+24	-8	+30	-3
130	-34	+46	-1	+2	+13	-28	+44	-2	+4	+18	-18	+41	-2	+5	+26	-7	+39	-3
140	-29	+55	-1	-2	+22	-23	+53	-2	-4	+24	-15	+49	-2	-5	+27	-6	+46	-3
150	-23	+62	-1	-7	+31	-18	+60	-2	-11	+29	-12	+55	-2	-14	+27	-5	+52	-3
160	-15	+68	-1	-11	+41	-12	+65	-1	-17	+35	-8	+60	-1	-21	+30	-3	+56	-2
170	-8	+71	0	-13	+50	-6	+68	-1	-21	+40	-4	+63	-1	-25	+33	-2	+59	-1
180	0	+72	0	-14	+58	0	+69	0	-22	+47	0	+64	0	-27	+37	0	+60	0
190	+8	+71	0	-13	+66	+6	+68	+1	-21	+54	+4	+63	+1	-25	+43	+2	+59	+1
200	+15	+68	+1	-11	+73	+12	+65	+1	-17	+61	+8	+60	+1	-21	+48	+3	+56	+2
210	+23	+62	+1	-7	+79	+18	+60	+2	-11	+69	+12	+55	+2	-14	+55	+5	+52	+3
220	+29	+55	+1	-2	+83	+25	+53	+2	-4	+76	+15	+49	+2	-5	+61	+6	+46	+3
230	+34	+46	+1	+2	+83	+28	+44	+2	+4	+78	+18	+41	+2	+5	+66	+7	+39	+3
240	+39	+36	+1	+7	+83	+31	+35	+2	+11	+79	+20	+32	+2	+14	+68	+8	+30	+3
250	+42	+25	+1	+11	+79	+34	+24	+1	+17	+76	+22	+22	+1	+21	+66	+8	+21	+2
260	+44	+13	0	+13	+70	+35	+12	+1	+21	+69	+23	+11	+1	+25	+60	+9	+10	+1
270	+45	0	0	+14	+59	+36	0	0	+22	+58	+23	0	0	+27	+50	+9	0	0
280	+44	-13	0	+13	+44	+35	-12	-1	+21	+43	+23	-11	-1	+25	+36	+9	-10	-1
290	+42	-25	-1	+11	+27	+34	-24	-1	+17	+26	+22	-22	-1	+21	+20	+8	-21	-2
300	+39	-36	-1	+7	+9	+31	-35	-2	+11	+5	+20	-32	-2	+14	0	+8	-30	-3
310	+34	-46	-1	+2	-11	+28	-44	-2	+4	-16	+18	-41	-2	+5	-20	+7	-39	-3
320	+29	-55	-1	-2	-29	+23	-53	-2	-4	-36	+15	-49	-2	-5	-41	+6	-46	-3
330	+23	-62	-1	-7	-47	+18	-60	-2	-11	-55	+12	-55	-2	-14	-59	+5	-52	-3
340	+15	-68	-1	-11	-65	+12	-65	-1	-17	-71	+8	-60	-1	-21	-74	+3	-56	-2
350	+8	-71	0	-13	-78	+6	-68	-1	-21	-84	+4	-63	-1	-25	-85	+2	-59	-1

			+20			+40			+60									
0	-28	-88	0	0	-55	0	-27	-82	0	-50	0	-22	-72	0	-47	0	-14	-61
+1	-26	-86	+1	-54	+1	-25	-77	+3	-49	+1	-21	-76	+5	-46	0	-13	-54	
+2	-21	-78	+2	-52	+1	-21	-70	+6	-47	+1	-17	-57	+10	-44	+1	-11	-44	
+3	-14	-68	+3	-48	+2	-14	-57	+9	-43	+2	-11	-43	+14	-41	+1	-7	-33	
+4	-5	-54	+4	-42	+2	-5	-41	+12	-38	+2	-4	-28	+18	-36	+1	-2	-19	
+5	+5	-38	+5	-35	+2	+5	-23	+14	-32	+2	+4	-12	+21	-30	+1	+2	-6	
+3	+14	-21	+5	-28	+2	+14	-7	+16	-25	+2	+11	+4	+24	-24	+1	+7	+8	
+2	+21	-7	+6	-19	+1	+21	+9	+17	-17	+1	+17	+18	+26	-16	+1	+11	+22	
+1	+26	+8	+6	-10	+1	+25	+22	+18	-9	+1	+21	+31	+28	-8	0	+10	+33	
0	+28	+19	+6	0	0	+27	+33	+18	0	0	+22	+40	+28	0	0	+14	+42	
-1	+26	+26	+6	+10	-1	+25	+40	+18	+9	-1	+21	+47	+28	+8	0	+10	+49	
-2	+21	+32	+6	+19	-1	+21	+45	+17	+17	-1	+17	+50	+26	+16	-1	+11	+52	
-2	+14	+30	+5	+28	-2	+14	+45	+16	+25	-2	+11	+50	+24	+24	-1	+7	+54	
-2	+5	+34	+5	+35	-2	+5	+40	+14	+32	-2	+4	+48	+21	+30	-1	+2	+52	
-2	-5	+32	+4	+42	-2	-5	+39	+12	+38	-2	-4	+44	+18	+36	-1	-2	+51	
-2	-14	+30	+3	+48	-2	-14	+35	+9	+40	-2	-11	+39	+14	+41	-1	-7	+47	
-2	-21	+30	+2	+52	-1	-21	+32	+6	+47	-1	-17	+35	+10	+44	-1	-11	+42	
-1	-26	+30	+1	+54	-1	-25	+29	+3	+49	-1	-21	+30	+5	+46	0	-10	+38	
0	-28	+32	0	+55	0	-27	+28	0	+50	0	-22	+28	0	+47	0	-14	+33	
+1	-26	+36	-1	+54	+1	-25	+29	-3	+49	+1	-21	+26	-5	+46	0	-10	+28	
+2	-21	+40	-2	+52	+1	-21	+30	-6	+47	+1	-17	+25	-10	+44	+1	-11	+24	
+3	-14	+46	-3	+48	+2	-14	+33	-9	+43	+2	-11	+25	-14	+41	+1	-7	+21	
+4	-5	+50	-4	+42	+2	-5	+35	-12	+38	+2	-4	+24	-18	+36	+1	-2	+17	
+5	+5	+54	-5	+35	+2	+5	+37	-14	+32	+2	+4	+24	-21	+30	+1	+2	+12	
+2	+14	+55	-5	+28	+2	+14	+29	-16	+25	+2	+11	+22	-24	+24	+1	+7	+8	
+2	+21	+52	-6	+19	+1	+21	+35	-17	+17	+1	+17	+18	-26	+16	+1	+11	+2	
+1	+26	+46	-6	+10	+1	+25	+30	-18	+9	+1	+21	+13	-28	+8	0	+10	-7	
0	+28	+37	-6	0	0	+27	+21	-18	0	0	+22	+4	-28	0	0	+14	-14	
-1	+26	+34	-6	-10	-1	+25	+8	-18	-9	-1	+21	-7	-28	-8	0	+10	-23	
-2	+21	+6	-6	-19	-1	+21	-5	-17	-17	-1	+17	-18	-26	-16	-1	+11	-32	
-3	+14	-11	-5	-28	-2	+14	-21	-16	-25	-2	+11	-32	-24	-24	-1	+7	-42	
-4	+5	-30	-5	-35	-2	+5	-37	-14	-32	-2	+4	-44	-21	-30	-1	+2	-50	
-5	-5	-48	-4	-42	-2	-5	-53	-12	-38	-2	-4	-56	-18	-36	-1	-2	-57	
-6	-14	-64	-3	-48	-2	-14	-67	-9	-43	-2	-11	-65	-14	-41	-1	-7	-63	
-7	-21	-76	-2	-52	-1	-21	-76	-6	-47	-1	-17	-71	-10	-44	-1	-11	-66	
-8	-26	-84	-1	-54	-1	-25	-81	-3	-49	-1	-21	-74	-5	-46	0	-13	-64	

III Táblák

L

MAGYAR
TUDOMÁNYOS AKADÉMIA
KÖNYVTÁRA

Z	q = -60					-40					-20					0					
0	0	+64	0	-2	-492	-426	0	+76	0	-5	-355	-242	0	+57	0	-7	-192	-19	0	+18	0
10	-14	+63	-4	-2	-511	-20	+75	-9	-5	-385	-22	+56	-13	-7	-228	-21	+18	-1			
20	-27	+60	-7	-2	-530	-39	+71	-16	-4	-414	-43	+54	-24	-6	-261	-41	+17	-2			
30	-39	+55	-10	-2	-550	-57	+66	-22	-4	-443	-63	+49	-32	-5	-293	-60	+16	-3			
40	-50	+49	-11	-1	-567	-73	+58	-25	-3	-469	-81	+44	-36	-4	-319	-77	+14	-4			
50	-60	+41	-11	-1	-585	-87	+49	-25	-2	-491	-97	+37	-36	-3	-341	-91	+12	-4			
60	-68	+32	-10	-1	-601	-98	+38	-22	-1	-509	-109	+29	-32	-2	-356	-102	+9	-5			
70	-73	+22	-7	0	-612	-106	+26	-16	-1	-523	-118	+19	-24	-1	-366	-112	+6	-5			
80	-77	+11	-4	0	-624	-117	+13	-9	0	-533	-124	+10	-13	0	-369	-117	+3	-6			
90	-78	0	0	0	-632	-113	0	0	0	-539	-126	0	0	0	-368	-119	0	-6			
100	-77	-11	+4	0	-638	-111	-13	+9	0	-541	-124	-10	+13	0	-363	-117	-3	-6			
110	-73	-22	+7	0	-642	-106	-26	+16	-1	-543	-118	-19	+24	-1	-356	-112	-6	-6			
120	-68	-32	+10	-1	-645	-98	-38	+22	-1	-541	-109	-29	+32	-2	-350	-102	-9	-6			
130	-60	-41	+11	-1	-645	-87	-49	+25	-2	-539	-97	-37	+36	-3	-343	-91	-12	-6			
140	-50	-49	+11	-1	-643	-73	-58	+25	-3	-535	-81	-44	+36	-4	-335	-77	-14	-6			
150	-39	-55	+10	-2	-640	-57	-66	+22	-4	-531	-63	-49	+32	-5	-327	-60	-16	-6			
160	-27	-60	+7	-2	-636	-39	-71	+16	-4	-524	-43	-54	+24	-6	-321	-41	-17	-6			
170	-14	-63	+4	-2	-629	-20	-75	+9	-5	-517	-22	-56	+13	-7	-314	-21	-18	-6			
180	0	-64	0	-2	-620	0	-76	0	-5	-507	0	-57	0	-7	-306	0	-18	-6			
190	+14	-63	-4	-2	-609	+20	-75	-9	-5	-495	+22	-56	-13	-7	-296	+21	-18	-6			
200	+27	-60	-7	-2	-596	+39	-71	-16	-4	-478	+43	-54	-24	-6	-283	+41	-17	-6			
210	+39	-55	-10	-2	-582	+57	-66	-22	-4	-461	+63	-49	-32	-5	-265	+60	-16	-6			
220	+50	-49	-11	-1	-567	+73	-58	-25	-3	-442	+81	-44	-36	-4	-245	+77	-14	-6			
230	+60	-41	-11	-1	-547	+87	-49	-25	-2	-415	+97	-37	-36	-3	-218	+91	-12	-6			
240	+68	-32	-10	-1	-529	+98	-38	-22	-1	-389	+109	-29	-32	-2	-196	+102	-9	-6			
250	+73	-22	-7	0	-510	+106	-26	-16	-1	-363	+118	-19	-24	-1	-168	+112	-6	-6			
260	+77	-11	-4	0	-492	+117	-13	-9	0	-337	+124	-10	-13	0	-141	+117	-3	-6			
270	+78	0	0	0	-476	+113	0	0	0	-313	+126	0	0	0	-116	+119	0	-6			
280	+77	+11	+4	0	-462	+111	+13	+9	0	-293	+124	+10	+13	0	-95	+117	+3	-6			
290	+73	+22	+7	0	-452	+106	+26	+16	-1	-274	+118	+19	+24	-1	-82	+112	+6	-6			
300	+68	+32	+10	-1	-445	+98	+38	+22	-1	-269	+109	+29	+32	-2	-74	+102	+9	-6			
310	+60	+41	+11	-1	-443	+87	+49	+25	-2	-267	+97	+37	+36	-3	-75	+91	+12	-6			
320	+50	+49	+11	-1	-445	+73	+58	+25	-3	-276	+81	+44	+36	-4	-85	+77	+14	-6			
330	+39	+55	+10	-2	-452	+57	+66	+22	-4	-285	+63	+49	+32	-5	-104	+60	+16	-6			
340	+27	+60	+7	-2	-462	+39	+71	+16	-4	-304	+43	+54	+24	-6	-127	+41	+17	-6			
350	+14	+63	+4	-2	-475	+20	+75	+9	-5	-336	+22	+56	+13	-7	-158	+21	+18	-6			

0				+20				+40				+60									
18	0	-8	-9	+219	0	-24	0	-7	+188	+441	0	-49	0	-5	+387	+612	0	-46	0	-2	+564
18	-14	-8	-44		-17	-24	-13	-7	+158		-12	-48	-9	-5	+367		-7	-45	-4	-2	+554
17	-27	-7	-77		-34	-23	-24	-6	+124		-24	-46	-16	-4	+347		-14	-40	-7	-2	+546
16	-36	-6	-105		-49	-21	-22	-5	+112		-35	-42	-22	-4	+338		-21	-40	-10	-2	+539
14	-41	-5	-128		-63	-18	-26	-4	+98		-45	-38	-25	-2	+330		-26	-35	-11	-1	+539
12	-41	-2	-142		-75	-15	-26	-2	+90		-54	-32	-25	-2	+328		-31	-30	-11	-1	+539
9	-26	-2	-150		-84	-12	-22	-2	+89		-60	-25	-22	-1	+333		-34	-23	-10	-1	+544
6	-27	-1	-153		-92	-8	-24	-1	+94		-66	-17	-16	-1	+341		-39	-16	-7	0	+550
3	-4	0	-147		-97	-4	-13	0	+105		-69	-9	-9	0	+354		-40	-8	-4	0	+560
0	0	0	-138		-98	0	0	0	+121		-70	0	0	0	+371		-41	0	0	0	+571
-3	+14	0	-125		-97	+4	+10	0	+139		-69	+9	+9	0	+390		-40	+8	+4	0	+584
-6	+27	-1	-111		-92	+8	+24	-1	+158		-66	+17	+16	-1	+407		-39	+16	+7	0	+596
-9	+26	-2	-96		-84	+12	+22	-2	+177		-60	+25	+22	-1	+427		-34	+23	+10	-1	+610
12	+41	-2	-84		-75	+15	+26	-2	+192		-54	+22	+25	-2	+442		-31	+20	+11	-1	+621
14	+41	-5	-74		-67	+18	+26	-4	+206		-45	+28	+25	-2	+456		-26	+25	+11	-1	+631
16	+26	-6	-65		-49	+21	+22	-5	+218		-35	+42	+22	-4	+466		-21	+40	+10	-2	+639
17	+27	-7	-57		-34	+22	+24	-6	+226		-24	+46	+16	-4	+475		-14	+40	+7	-2	+646
18	+14	-8	-52		-17	+24	+13	-7	+232		-12	+48	+9	-5	+481		-7	+45	+4	-2	+650
18	0	-8	-45		0	+24	0	-7	+236		0	+49	0	-5	+485		0	+46	0	-2	+656
18	-14	-8	-38		+17	+24	-12	-7	+240		+12	+48	-9	-5	+487		+7	+45	-4	-2	+658
17	-27	-7	-29		+24	+22	-24	-6	+246		+24	+46	-16	-4	+491		+14	+40	-7	-2	+660
16	-26	-6	-17		+49	+21	-22	-5	+252		+35	+42	-22	-4	+492		+21	+40	-10	-2	+664
14	-41	-5	-2		+63	+18	-26	-4	+260		+45	+28	-25	-2	+496		+26	+25	-11	-1	+664
12	-41	-2	+76		+75	+15	-26	-2	+270		+54	+22	-25	-2	+500		+31	+20	-11	-1	+664
9	-26	-2	+36		+84	+12	-22	-2	+281		+60	+25	-22	-1	+503		+34	+23	-10	-1	+658
6	-27	-1	+59		+92	+8	-24	-1	+294		+66	+17	-16	-1	+507		+39	+16	-7	0	+660
3	-4	0	+81		+97	+4	-13	0	+307		+69	+9	-9	0	+510		+40	+8	-4	0	+656
0	0	0	+100		+98	+0	0	0	+317		+70	0	0	0	+511		+41	0	0	0	+653
3	+14	0	+115		+97	-4	+10	0	+325		+69	-9	+9	0	+510		+40	-8	+4	0	+648
6	+27	+1	+125		+92	-8	+24	-1	+326		+66	-17	+16	-1	+505		+39	-16	+7	0	+642
9	+26	-2	+126		+84	-12	+22	-2	+321		+60	-25	+22	-1	+497		+34	-23	+10	-1	+632
12	+41	-2	+121		+75	-15	+26	-2	+312		+54	-32	+25	-2	+486		+31	-30	+11	-1	+623
14	+41	-5	+108		+67	-18	+26	-4	+296		+45	-38	+25	-3	+470		+26	-35	+11	-1	+613
16	+26	-6	+87		+49	-21	+22	-5	+274		+35	-42	+22	-4	+452		+21	-40	+10	-2	+604
17	+27	-7	+59		+34	-22	+24	-6	+248		+24	-46	+16	-4	+431		+14	-40	+7	-2	+588
18	+14	-8	+26		+17	-24	+13	-7	+218		+12	-48	+9	-5	+409		+7	-45	+4	-2	+576

III. Formulas.

$\varphi = +60$.

$q=+60$	X_t	X_0	$X_t - X_0$		Y_t	Y_0	$Y_t - Y_0$
0							
10							
20							
30							
40							
50							
60							
70							
80							
90							
100							
110							
120							
130							
140							
150							
160							
170							
180							
190							
200							
210							
220							
230							
240							
250							
260							
270							
280							
290							
300							
310							
320							
330							
340							
350							

MAGYAR
 TUDOMÁNYOS AKADÉMIA
 KÖNYVTÁRA

Z_t	Z_s	$Z_t - Z_s$
+ 466	+564	-98
+ 458	+554	-96
+ 464	+546	-82
+ 475	+539	-64
+ 490	+539	-49
+ 509	+539	-40
+ 523	+544	-21
+ 534	+550	-16
+ 546	+560	-14
+ 552	+571	-19
+ 560	+584	-24
+ 563	+596	-33
+ 560	+610	-50
+ 553	+627	-68
+ 539	+631	-92
+ 512	+639	-127
+ 495	+646	-151
+ 496	+650	-154
+ 501	+656	-155
+ 518	+658	-140
+ 541	+660	-119
+ 563	+661	-98
+ 581	+661	-80
+ 604	+661	-57
+ 632	+658	-26
+ 638	+660	-22
+ 629	+656	-27
+ 574*	+653	-79*
+ 620 ^{Jan.} (546)	+648	-28 ^{Jan.} (102)
+ 592	+642	-50
+ 589	+632	-43
+ 567	+623	-62
+ 534	+613	-79
+ 512	+601	-89
+ 499	+588	-89
+ 482	+576	-94

III Formulák

$\varphi = +40$

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$\varphi = +40$	X_t	X_0	$(X_t - X_0)$	$X_0(X_t - X_0)$	Y_t	Y_0	$(Y_t - Y_0)$	$Y_0(Y_t - Y_0)$	
0	+220	+269	-49	-13	-13181	-61	-72	+11	-792
10	233	281	-48		-13488	-49	-76	+27	-2052
20	244	293	-49		-14057	-25	-57	+22	-1254
30	255	301	-46		-13846	-19	-40	+24	-1032
40	264	311	-47		-14617	-3	-28	+25	-700
50	271	317	-46		-14582	+11	-12	+23	-276
60	276	321	-45		-14445	+23	+4	+19	+76
70	280	323	-43		-13889	+30	+18	+12	+216
80	283	322	-39		-12558	+33	+31	+2	+62
90	284	320	-36		-11520	+30	+40	-10	-400
100	285	316	-31		-9796	+16	+47	-31	-1457
110	285	313	-28		-8764	-2	+50	-52	-2600
120	283	311	-28		-8708	-18	+50	-68	-3400
130	281	305	-24		-7320	-28	+48	-76	-3648
140	281	303	-22		-6666	-26	+44	-70	-3080
150	279	301	-21		-6321	-9	+39	-48	-1872
160	272	299	-27		-8073	+12	+35	-23	-805
170	263	297	-34		-10098	+34	+30	+4	+120
180	251	295	-44		-12980	+51	+28	+23	+64
190	244	293	-49		-14257	+59	+26	+33	+858
200	241	289	-48		-13872	+64	+25	+39	+975
210	240	283	-43		-12169	+70	+25	+45	+1125
220	239	279	-40		-11160	+75	+24	+51	+1224
230	235	277	-36		-9756	+76	+24	+52	+1248
240	229	268	-34		-8942	+73	+22	+51	+1122
250	224	257	-29		-7327	+64	+18	+46	+828
260	213	246	-33		-8118	+47	+18	+34	+442
270	204	238	-34		-8092	+20	+4	+16	+64
280	197	232	-35		-5800	-6	+7	-13	-91
290	185	227	-42		-9534	-33	-18	-15	+270
300	173	225	-52		-11700	-55	-32	-23	+736
310	167	227	-60		-13620	-70	-44	-26	+1144
320	166	231	-65		-15075	-79	-56	-23	+1282
330	172	237	-65		-15405	-84	-65	-19	+1233
340	187	247	-60		-14820	-81	-71	-10	+710
350	205	257	-52		-13364	-73	-74	+1	-74

	Z_t	Z_0	$(Z_t - Z_0)$	$Z_0(Z_t - Z_0)$		$\{Z_t + Z_0 - Z_t\}$
-792	+375	+387	-12		-4644	-9329
-2052	+361	+367	-6		-2202	-13338
-1254	+349	+347	+2		+694	-16305
-1032	+348	+338	+10		+3380	-18258
-700	+356	+330	+26		+8580	-23957
-276	+366	+328	+38		+12464	-27222
+76	+380	+330	+47		+15651	-30020
+216	+397	+341	+56		+19096	-32769
+62	+410	+354	+56		+19824	-32320
-400	+426	+371	+55		+20405	-32325
-1457	+439	+390	+49		+19110	-30363
-2600	+443	+407	+36		+14652	-26016
-3400	+437	+427	+10		+4270	-16378
-3648	+418	+442	-24		-10608	-260
-2080	+391	+456	-65		-29640	+19894
-1872	+364	+466	-102		-47532	+39339
-805	+348	+475	-127		-60225	+57347
+120	+344	+481	-137		-65897	+55919
+644	+351	+485	-134		-64990	+62654
+858	+367	+487	-120		-58440	+44941
+975	+388	+491	-103		-50573	+37676
+1125	+415	+492	-77		-37884	+26840
+1224	+444	+496	-52		-25792	+15756
+1248	+475	+500	-25		-12500	+3992
+1122	+507	+503	+4		+2012	-9822
+828	+541	+507	+34		+17728	-24247
+442	+567	+510	+57		+29070	-36746
+64	+576	+511	+65		+32215	-41243
-91	+586	+510	+76		+38760	-44651
+270	+567	+505	+62		+31310	-40574
+736	+534	+497	+37		+18389	-29333
+1144	+501	+486	+15		+7290	-19766
+1288	+457	+470	-13		-6110	-7617
+1235	+431	+452	-21		-9492	-4678
+710	+411	+421	-20		-8620	-5490
-74	+390	+409	-19		-7771	-5667

IV Formulák $m_a = -318,5$ $m_b = +59,8$ $m_c = +24,5$ $16,5/104/3$
 $e = -31,7$ $f = -28,2$ $g = -53,3$ $h = +1,2$ $i = -2,2$

$$X_{IV} = (318,5 \cos \varphi - 1,2 \sin \varphi) + (59,8 \sin \varphi + 31,7 \cos \varphi) \sin \alpha - (24,5 \sin \varphi + 53,3 \cos \varphi) \cos \alpha + 14,1 \sin \varphi \sin \alpha + 2,2 \sin \varphi \cos \alpha$$

$\varphi = -60$	+160	-68 sin α	+48 cos α	-12 sin α	-2 cos α	5)
-40	+245	-33 sin α	+7 cos α	-14 sin α	-2 cos α	
-20	+300	+4 sin α	-32 cos α	-9 sin α	-1 cos α	1)
0	+319	+32 sin α	-53 cos α	0	0	
+20	+299	+45 sin α	-49 cos α	+9 sin α	+1 cos α	2)
+40	+243	+44 sin α	-25 cos α	+14 sin α	+2 cos α	3)
+60	+158	+26 sin α	+6 cos α	+12 sin α	+2 cos α	4)
						5)

$$y_{IV} = (-24,5 + 53,3 \sin \varphi) \sin \alpha + (-59,8 + 31,7 \sin \varphi) \cos \alpha + 2,2 \cos \varphi \sin \alpha - 28,2 \cos \varphi \cos \alpha$$

$\varphi = -60$		-71 sin α	-87 cos α	+1 sin α	-14 cos α
-40		-59 sin α	-80 cos α	+2 sin α	-21 cos α
-20		-43 sin α	-71 cos α	+2 sin α	-27 cos α
0		-25 sin α	-60 cos α	+2 sin α	-28 cos α
+20		-6 sin α	-49 cos α	+2 sin α	-27 cos α
+40		+10 sin α	-39 cos α	+2 sin α	-21 cos α
+60		+22 sin α	-32 cos α	+1 sin α	-14 cos α

$$Z_{IV} = (-0,2 + 637,0 \sin \varphi + 3,6 \cos \varphi) + (-119,6 \cos \varphi + 47,6 \sin \varphi) \sin \alpha + (49,0 \cos \varphi - 80 \sin \varphi) \cos \alpha - 42,3 \cos \varphi \sin \alpha - 6,6 \cos \varphi \cos \alpha$$

$\varphi = -60$	-551	-101 sin α	+94 cos α	-11 sin α	-2 cos α
-40	-408	-139 sin α	+116 cos α	-25 sin α	-4 cos α
-20	-215	-143 sin α	+98 cos α	-37 sin α	-6 cos α
0	+3	-120 sin α	+49 cos α	-42 sin α	-7 cos α
+20	+221	-82 sin α	-5 cos α	-27 sin α	-6 cos α
+40	+412	-45 sin α	-41 cos α	-25 sin α	-4 cos α
+60	+552	-19 sin α	-44 cos α	-11 sin α	-2 cos α

Összes értékeként (Hauer) $\varphi = -40 \text{ m}$ $\varphi = +40 \text{ m}$ · IV Formula

$$\mu_h = -318,5 \quad \mu_l = +59,8 \quad \mu_c = +24,5$$

$$\lambda = 0 \quad \varphi = +40 \text{ m} \quad X = +220 \dots 1) \quad Y = -61 \dots 2)$$

$$\lambda = 142 \quad \varphi = 0 \quad X = +380 \dots 3) \quad Y = +24 \dots 4) \quad Z = -82 \dots 5)$$

$$+220 = 243,97 - 15,75 - 0,985 \underline{h} + 0,1174 \underline{g} - 0,985 \underline{i} \dots 1)$$

$$-61 = -59,8 - 0,643 \underline{e} + 0,766 \underline{f} \dots 2)$$

$$+380 = 318,5 - 0,616 \underline{e} - 0,788 \underline{g} \dots 3)$$

$$+24 = -15,08 + 47,12 + 0,970 \underline{i} + 0,208 \underline{f} \dots 4)$$

$$-82 = -73,64 - 38,61 + \underline{h} + 0,863 \underline{i} - 1,455 \underline{f} \dots 5)$$

eredőket

$$e = -31,712$$

$$f = -28,185$$

$$g = -53,256$$

$$i = -2,244$$

$$h = +1,179$$

IV Formula

$\varphi = +60$

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+60

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Z_t	Z_0	$Z_t - Z_0$			t_{br}
+466	+506	-40			
+458	+500	-42			
+464	+496	-32			
+475	+492	-17			
+490	+494	-4			
+509	+497	+12			
+523	+503	+20			
+534	+512	+22			
+546	+521	+25			
+552	+533	+19			
+560	+545	+15			
+563	+556	+7			
+560	+567	-7			
+553	+575	-22			
+539	+584	-45			
+512	+588	-76			
+495	+592	-97			
+496	+594	-98			
+501	+594	-93			
+578	+592	-74			
+541	+590	-49			
+563	+588	-25			
+581	+586	-5			
+604	+583	+21			
+632	+579	+53			
+638	+578	+60			
+629	+575	+54			
+574*	+571	+3			
+620 ^{jav.}	+567	+53			
+592	+562	+30			
+589	+555	+34			
+561	+549	+12			
+534	+540	-6			
+572	+532	-20			
+499	+522	-23			
+482	+514	-32			

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IV Formulas

$\varphi = +40$

Z_t	Z_0	$Z_t - Z_0$	f_{uv}
+375	+367	+8	
+361	+351	+10	
+349	+338	+11	
+348	+328	+20	
+356	+325	+31	
+366	+325	+41	
+380	+330	+50	
+397	+340	+57	
+410	+352	+58	
+426	+367	+59	
+439	+384	+55	
+443	+400	+43	
+437	+416	+21	
+418	+429	-9	
+391	+437	-46	
+364	+444	-80	
+348	+448	-100	
+344	+449	-105	
+351	+449	-98	
+367	+447	-80	
+388	+446	-58	
+415	+446	-31	
+444	+445	-1	
+475	+445	+30	
+507	+448	+59	
+541	+452	+89	
+567	+454	+113	
+576	+457	+119	
+586	+458	+128	
+567	+456	+111	
+534	+450	+84	
+501	+443	+68	
+457	+433	+24	
+431	+418	+13	
+411	+400	+11	
+390	+385	+5	

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IV Formulák

$\varphi = +20$

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188
895
912
928
944
960
976
992
1008
1024
1040
1056
1072
1088
1104
1120
1136
1152
1168
1184
1200

+20

0

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30

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90

100

110

120

130

140

150

160

170

180

190

200

210

220

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Z_t	Z_s	$Z_t - Z_s$			$+20$
+174	+210	-36			
+139	+183	-44			
+125	+159	-34			
+123	+139	-16			
+126	+124	+2			
+131	+117	+14			
+137	+113	+24			
+146	+117	+29			
+160	+126	+34			
+173	+139	+34			
+187	+154	+33			
+197	+169	+28			
+199	+183	+16			
+192	+195	-3			
+179	+204	-25			
+166	+211	-45			
+160	+217	-57			
+167	+219	-52			
+186	+220	-34			
+208	+221	-13			
+231	+225	+6			
+248	+229	+19			
+265	+238	+27			
+280	+249	+31			
+298	+261	+37			
+320	+275	+45			
+340	+290	+50			
+355	+303	+52			
+370	+314	+56			
+374	+319	+55			
+376	+317	+59			
+313	+315	-2			
+347	+302	+45			
+262	+285	-23			
+268	+263	+5			
+220	+237	-17			

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IV Formák

$\varphi = 0$

MAGYAR
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KÖNYVTÁRA

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Z_t	Z_1	$Z_t - Z_1$
-41	+45	-86
-86	+9	-95
-120	-25	-95
-133	-56	-77
-137	-81	-56
-138	-101	-37
-136	-114	-22
-134	-121	-13
-137	-120	-11
-126	-117	-9
-116	-110	-6
-101	-101	0
-91	-92	+1
-85	-83	-2
-83	-75	-8
-77	-69	-8
-63	-63	0
-43	-59	+16
-21	-53	+32
-5	-45	+40
+5	-35	+40
+10	-20	+30
+14	-3	+17
+18	+19	-1
+25	+44	-19
+38	+71	-33
+52	+98	-46
+73	+123	-50
+96	+144	-48
+115	+159	-44
+133	+166	-33
+148	+165	-17
+141	+155	-14
+114	+135	-21
+67	+111	-44
+10	+79	-69

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IV Formulas

$\varphi = -20$

MAGYAR
TUDOMÁNYOS AKADEÉMIA
KÖNYVTÁRA

-20

0

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90

100

110

120

130

140

150

160

170

180

190

200

210

220

230

240

250

260

270

280

290

300

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320

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340

350

Z_t	Z_0	$Z_t - Z_0$
-170	-123	-47
-272	-162	-50
-246	-201	-45
-284	-239	-45
-317	-272	-45
-336	-300	-36
-348	-324	-24
-357	-340	-17
-362	-352	-10
-369	-358	-11
-375	-360	-15
-383	-360	-23
-388	-358	-30
-389	-354	-35
-384	-350	-34
-364	-345	-19
-335	-337	+2
-311	-330	+19
-287	-319	+32
-263	-306	+43
-247	-287	+40
-234	-265	+31
-227	-238	+11
-217	-206	-11
-205	-174	-31
-187	-140	-47
-163	-104	-59
-136	-72	-64
-108	-44	-64
-77	-24	-53
-52	-12	-40
-37	-8	+29
-35	-16	-19
-48	-31	-17
-76	-55	-21
-121	-86	-35

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IV Formula'y

$\varphi = -40$

MAGYAR
TUDOMÁNYOS AKADÉMIA
KÖNYVTÁRA

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120

130

140

150

160

170

180

190

200

210

220

230

240

250

260

270

280

290

300

310

320

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340

350

Z_t	Z_0	$Z_t - Z_0$
-258	-296	+38
-287	-331	+44
-317	-367	+50
-348	-403	+55
-378	-435	+57
-407	-464	+57
-435	-493	+60
-458	-515	+57
-478	-534	+56
-497	-547	+50
-519	-557	+48
-542	-563	+21
-566	-565	-1
-591	-566	-25
-585	-563	-22
-565	-559	-6
-540	-553	+13
-525	-541	+16
-501	-528	+17
-482	-511	+29
-463	-489	+26
-443	-463	+20
-428	-435	+7
-416	-404	-12
-404	-369	-35
-388	-333	-55
-360	-300	-60
-334	-269	-65
-284	-244	-40
-235	-221	-14
-195	-209	+14
-173	-204	+31
-168	-207	+39
-180	-219	+39
-202	-239	+37
-230	-265	+35

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IV Formulae

$\varphi = -60$

MAGYAR
TUDOMÁNYOS AKADÉMIA
KÖNYVTÁRA

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180

190

200

210

220

230

240

250

260

270

280

290

300

310

320

330

340

350

Z_t	Z_s	$Z_t - Z_s$
-370	-459	+89
-390	-482	+92
-407	-507	+100
-428	-533	+105
-450	-556	+106
-469	-580	+111
-491	-602	+111
-513	-621	+108
-539	-638	+99
-575	-652	+77
-602	-662	+60
-631	-671	+40
-645	-676	+31
-650	-678	+28
-655	-678	+23
-627*	-675	+48*
-639	-669	+30
-638	-660	+22
-639	-647	+8
-636	-632	-4
-633	-613	-20
-631	-593	-38
-624	-570	-54
-623	-546	-77
-606	-522	-84
-588	-495	-93
-561	-472	-89
-522	-450	-72
-476	-432	-44
-425	-417	-8
-380	-408	+20
-353	-404	+51
-341	-404	+63
-343	-411	+68
-350	-423	+73
-359	-438	+79

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KÖNYVTÁRA

IV Formelk

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MAGYAR
TUDOMÁNYOS AKADÉMIA
KÖNYVTÁRA

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Z	-55	-60					-40					-20					0				
0	0	+94	0	-2	-459	-408	0	+116	0	-4	-296	-215	0	+98	0	-6	-123	+3	0	+49	0
10	-18	+93	-4	-2	-482		-24	+114	-9	-4	-321		-25	+97	-13	-6	-162		-21	+48	-14
20	-35	+88	-7	-2	-507		-48	+109	-16	-4	-367		-49	+92	-24	-5	-201		-41	+46	-27
30	-51	+81	-10	-2	-533		-70	+100	-22	-3	-403		-72	+85	-32	-5	-239		-60	+42	-36
40	-65	+72	-11	-1	-556		-89	+89	-25	-2	-425		-92	+75	-36	-4	-272		-77	+38	-41
50	-77	+60	-11	-1	-580		-106	+75	-25	-2	-464		-110	+63	-36	-2	-300		-92	+32	-41
60	-87	+47	-10	-1	-602		-120	+58	-22	-1	-493		-124	+49	-32	-2	-324		-104	+25	-36
70	-95	+32	-7	0	-621		-131	+40	-16	0	-515		-134	+34	-24	-1	-340		-113	+17	-27
80	-99	+16	-4	0	-638		-137	+20	-9	0	-524		-141	+17	-12	0	-352		-118	+9	-14
90	-101	0	0	0	-652		-139	0	0	0	-547		-143	0	0	0	-358		-120	0	0
100	-99	-16	+4	0	-662		-127	-20	+9	0	-557		-141	-17	+12	0	-360		-118	-9	+14
110	-95	-22	+7	0	-671		-121	-40	+16	0	-563		-124	-24	+24	-1	-360		-113	-17	+27
120	-87	-47	+10	-1	-676		-120	-58	+22	-1	-565		-124	-49	+22	-2	-358		-104	-25	+36
130	-77	-60	+11	-1	-678		-106	-75	+25	-2	-566		-110	-63	+36	-2	-354		-92	-22	+41
140	-65	-72	+11	-1	-678		-89	-89	+25	-2	-563		-92	-75	+36	-4	-350		-77	-28	+41
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180	0	-94	0	-2	-647		0	-116	0	-4	-528		0	-98	0	-6	-319		0	-49	0
190	+78	-93	-4	-2	-632		+24	-114	-9	-4	-511		+25	-97	-12	-6	-306		+21	-48	-14
200	+25	-88	-7	-2	-613		+48	-109	-16	-4	-489		+49	-92	-24	-5	-287		+41	-46	-27
210	+51	-81	-10	-2	-593		+70	-100	-22	-3	-463		+72	-85	-32	-5	-265		+60	-42	-36
220	+65	-72	-11	-1	-570		+89	-89	-25	-2	-435		+92	-75	-36	-4	-238		+77	-38	-41
230	+77	-60	-11	-1	-546		+106	-75	-25	-2	-404		+110	-63	-36	-2	-206		+92	-22	-41
240	+87	-47	-10	-1	-522		+120	-58	-22	-1	-369		+124	-49	-32	-2	-174		+104	-25	-36
250	+95	-22	-7	0	-495		+121	-40	-16	0	-333		+124	-24	-24	-1	-140		+112	-17	-27
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270	+101	0	0	0	-450		+129	0	0	0	-269		+143	0	0	0	-72		+120	0	0
280	+99	+16	+4	0	-422		+127	+20	+9	0	-244		+141	+17	+12	0	-44		+118	+9	+14
290	+95	+32	+7	0	-417		+121	+40	+16	0	-221		+124	+34	+24	-1	-24		+112	+17	+27
300	+87	+47	+10	-1	-408		+120	+58	+22	-1	-209		+124	+49	+32	-2	-12		+104	+25	+36
310	+77	+60	+11	-1	-404		+106	+75	+25	-2	-204		+110	+63	+36	-2	-8		+92	+22	+41
320	+65	+72	+11	-1	-404		+89	+89	+25	-2	-207		+92	+75	+36	-4	-16		+77	+28	+41
330	+51	+81	+10	-2	-411		+70	+100	+22	-3	-219		+72	+85	+32	-5	-31		+60	+42	+36
340	+35	+88	+7	-2	-423		+48	+109	+16	-4	-239		+49	+92	+24	-5	-55		+41	+46	+27
350	+18	+93	+4	-2	-428		+24	+114	+9	-4	-265		+25	+97	+13	-6	-86		+21	+48	+14

0				+20				+40				+60									
+49	0	-7	+45	+221	0	-5	-6	+210	+412	0	-41	0	-4	+367	+552	0	-44	0	-2	+506	
+48	-14	-7	+9		-14	-5	-13	-6	+183		-8	-40	-9	-4	+351		-3	-43	-4	-2	+500
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-17	-27	-1	+71		+77	+2	-24	-1	+275		+42	+14	-16	0	+452		+18	+15	-7	0	+578
-9	-14	0	+98		+81	+1	-12	0	+290		+44	+7	-9	0	+454		+19	+8	-4	0	+575
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+22	+41	-2	+165		+62	-2	+26	-2	+315		+24	-26	+25	-2	+442		+15	-28	+11	-1	+549
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+42	+26	-5	+126		+41	-4	+22	-5	+285		+22	-26	+22	-2	+418		+10	-28	+10	-2	+522
+46	+27	-6	+111		+28	-5	+24	-5	+263		+15	-29	+16	-4	+400		+6	-41	+7	-2	+522
+48	+14	-7	+79		+14	-5	+13	-6	+227		+8	-46	+9	-4	+385		+2	-42	+4	-2	+514