Informe de trabajo

DETERMINATION OF MINOR PLANETS ORBITS BY MEANS OF FOUR OBSERVATIONS

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Von Veithen, among other authors, devised a method for the determination of the orbit of a minor planet, using four observations. He chose a Gaussian type procedure.

The fundamental system to solve in this method, is, in the first approximation:

$$\Delta_4 = (f_2 + g_2\xi + i_2\xi\eta)\,\Delta_1 + (k_2 + m_2\xi + o_2\xi\eta)$$

$$\Delta_4 = (f_3 + g_3\xi + i_3\xi\eta)\,\Delta_1 + (k_3 + m_3\xi + o_3\xi\eta)$$

$$r_1^2 = \Delta_1^2 + R_1^2 + 2\Delta_1 S_1$$

$$r_4^2 = \Delta_4^2 + R_4^2 + 2\Delta_4 S_4$$

where:

$$\xi = \frac{1}{(r_1 + r_4)^3} \qquad \eta = \frac{r_4 - r_1}{r_4 + r_1}$$

$f_i, g_i, i_i, k_i, m_i, o_i$ $(i=2,3)$ are functions of the observations and time intervals.

r_i, Δ_i $(i=2,3)$ are resp. the heliocentric and geocentric distances of the object in question.

$S_i = R_i \cos \Psi_i$ $(i=2,3)$ is the product of the Earth's heliocentric distance by the cosine of the angle between R_i and Δ_i

Now, we introduce a simple Lagrangean method in which the problem, in the first approximation, depends upon the solution of an algebraic equation of eigth degree, namely:

$$\Delta = P + \frac{Q + q\Delta}{r^3}$$

$$r^2 = \Delta^2 + R^2 - 2\Delta S$$

We have computed the orbit of La Plata 1957 III and obtained the following residuals (O-C):

$\Delta\alpha \cos\delta$	0"0	1"8	1"4	0"0
$\Delta\delta$	0"0	1"5	0"0	0"2

The total time interval is about 35 days.

We are now computing the orbit of Ino, 55 days total interval. By this way we intend to investigate the possible effects in a critical case for the convergence of the series.

For the present subject Jekhowski[1] and Rure[2] have made contributions but in a some different way.

Bibliography:

1) B.Jekhowski. J.des Observateurs. 8, 1 (1925)

2) H.Rure. J.des Observateurs. 15, 89 (1932)