GOCE Satellite Orbit in the Aspect
of Selected Gravitational Perturbations

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A b s t r a c t

In this work, the GOCE satellite orbit is described in the aspect of perturbations in the Keplerian osculating elements. The perturbations come from the Earth and ocean tides, the gravitation of the Moon, the gravitation of the Sun, the gravitation of planets and Pluto, and the relativity effects. These perturbations are computed for the 30-day interval with a sampling of 2 min. To obtain the simulated orbit, the Cowell numerical integration method of 8th order is used. The first part of the work contains the root mean square (RMS) values of aforementioned perturbations due to the specified forces. The perturbations were compared taking into account their RMS characteristics.

Perturbations in elements of the GOCE osculating orbit are also presented on the plots for successive epochs of the 30-day interval. Changes of the obtained perturbations were described and their characteristic periodic components were distinguished.

Key words: GOCE satellite orbit, orbital elements, perturbations.