

Perturbation Study of the KITSAT - 1 Satellite with Critical Inclination

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Abstract

The most celebrated problem in artificial satellite theory is undoubtedly the critical inclination problem. The KITSAT-1 satellite launched by Arian 42P from Guiana in August 11, 1992 has orbital inclination close to the critical value $\cos^{-1}(1/\sqrt{5})$. In that case, there is a singularity in some perturbation terms and therefore perigee will be fixed because $d\omega/dt$ is equals to zero. But actually the long periodic behaviour in argument of perigee, ω is affected by luni-solar gravity and relativistic effect, etc. Luni-solar gravity induces periodic perturbations in all orbital elements except the semi-major axis, and secular variations in Ω , ω and M . We have obtained nodal rate and inclination variations in case of the KITSAT-1. In this paper, we will also show the geopotential perturbations in Ω , M of the satellite including J_2 , J_3 , J_4 , J_2^2 terms.