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Research on the Strategy of Orbital Avoidance for Optical Remote Sensing Satellite

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Abstract : This paper focuses on the orbit avoidance strategies of optical remote sensing satellite. The optical remote sensing satellite, moving along the Sun-synchronous orbit, is equipped with laser warning equipment to alert CCD camera from laser attacks. There are three ways to protect the CCD camera: closing the camera cover, satellite attitude maneuver and satellite orbit avoidance. In order to enhance the safety of optical remote sensing satellite in orbit, this paper explores the strategy of satellite avoidance. The avoidance strategy is expressed as the evasion of pre-determined target points in the orbital coordinates of virtual satellite. The so-called virtual satellite is a passive vehicle which superposes the satellite at the initial stage of avoidance. The target points share the consistent cycle time and the same semi-major axis with the virtual satellite, which ensures the properties of the satellite's Sun-synchronous orbit remain unchanged. Moreover, to further strengthen the avoidance capability of satellite, it can perform multi-target-points avoid maneuvers. On occasions of fulfilling the satellite orbit tasks, the orbit can be restored back to virtual satellite through orbit maneuvers. Thereinto, the avoid maneuvers adopts pulse guidance. And the fuel consumption is also optimized. The avoidance strategy discussed in this article is applicable to optical remote sensing satellite when it is encountered with hostile attack of space-based laser anti-satellite.

Keywords : optical remote sensing satellite, satellite avoidance, virtual satellite, avoid target-point, avoid maneuver
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