

Controller Design using Sliding Mode Techniques for Satellite Formation Flying

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Satellite formation flying is currently an active area of research in the aerospace engineering. There are many categories for this research such as the determination of initial conditions, formation keeping, configuration and reconfiguration. In this study, a tracking controller using sliding mode techniques is designed to control a satellite for the satellite formation flying. In general, Hill's equations are used to describe the relative motion of the follower satellite with respect to the leader satellite. But, the modified Hill's equations considering J_2 perturbation were used for the design of sliding mode controller. Sliding mode control law causes the chattering phenomenon because it is a discontinuous control. Dead-zone was used to avoid the chattering. The Extended Kalman filter was applied to estimate the state vector based on the measurements of relative distance and velocity between two satellites.