Dynamics of the Rotating Triangular Variable-length Tethered Satellite

Formation near Libration Points

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In this paper, the dynamic stability of the rotating triangular variable-length tethered satellite formation near libration points is investigated for the reconfiguration stage. By the numerical simulation using the full nonlinear and time-varying motion equetions, it is shown that different rotating rates or tether-length rates have small impacts on the trajectories of the system's centroid. It can be drawn the conclusion that increasing the rotating rate or reducing tether-length rate can improve the stability of the tethered satellite system, which is consistent with the real situation.

Keywords: Rotating triangular variable-length tethered satellite formation, Coupling motion of the orbit and attitude, Reconfiguration stage, Libration point