Stabilization of Displaced Periodic Orbit Using Feedback Linearization Control Scheme

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Abstract : In the present work, we investigated displaced periodic orbits in the linear order in the circular restricted three-body Sun-Jupiter system, where the third mass-less body utilizes solar electric sail. The electric solar sail is a new space propulsion concept which uses the solar wind momentum for producing thrust, and it is somewhat like to the more well-known solar radiation pressure sail which is often called simply the solar sail. Moreover, we implement the feedback linearization control scheme to perform the stabilization and trajectory tracking for the nonlinear system. Further, we derived periodic orbits analytically in linear order by introducing a first order approximation. These approximate analytic solutions are utilized in a numerical search to determine displaced periodic orbit in the full nonlinear model. We found the displaced periodic orbit for the defined non-linear model and stabilized the model.

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