Nonlinear Relations to Final Semi-Major Axis in Continuous Orbital Transfers

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Abstract: We studied nonimpulsive orbital transfers under thrust errors through algebraic analysis method. We analyzed the relationship among final semi-major axis and mean deviations in the thrust vector. The nonlinear (near parabolic) relations were found, confirming the Monte-Carlo simulations realized in the numerical phase this investigation. These results suggest and partially characterize the progressive deformation of the final semi-major axis along the propulsive arc, turning 3sigma ellipsoids into banana shaped volumes curved to the center of attraction (we call them "bananoids") due to the loss of optimality of the actual (with errors) trajectories with respect to the nominal (no errors) trajectory.

Keywords: *Orbits; transfer; nonimpulsive; thrust errors; algebraic analysis.*

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