

Statistical Analysis of Nonimpulsive Orbital Transfers under Thrust Errors, 1

A.D.C. Jesus¹, M.L.O. Souza² and A.F.B.A. Prado²

¹*Departamento de Física, Universidade Estadual de Feira de Santana (UEFS),
KM. 03 BR. 116 – Campus Universitário, Caixa Postal 252-294,
CEP. 44.031-460, Feira de Santana, BA, Brazil*

²*Instituto Nacional de Pesquisas Espaciais (INPE), Avenida dos Astronautas 1758,
Caixa Postal 515, 12227-010, São Paulo, SP, Brazil*

Received: August 28, 2000; Revised: March 10, 2002

Abstract: In this paper we present the first part of an extensive study of nonimpulsive orbital transfers under thrust errors. We emphasize the first part of the numerical implementation (Monte-Carlo) of the study but mention the first algebraic explanation for some of the numerical results. Its main results suggest and partially characterize the progressive deformation of the trajectory distribution 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; Monte-Carlo analysis.*

Mathematics Subject Classification (2000): 70M20, 65C05, 62L70.