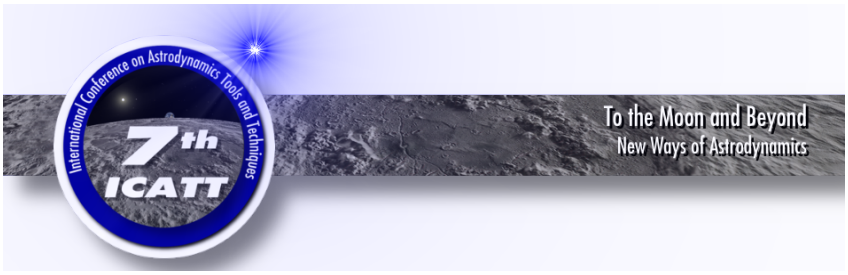

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Trajectory Design in High-Fidelity Models

Thursday, 8 November 2018 14:30 (30 minutes)

The design of space missions is generally driven by severe requirements on the Delta-v budget. Navigation is also becoming more and more challenging, asking for the satisfaction of stringent conditions characterized by unprecedented accuracy. As a consequence, an increased complexity in the trajectory design is needed, ultimately leading to employing high-fidelity models already in the early stages of trajectory design.

Flying in highly nonlinear gravity fields allows exploiting unique features, such as libration point orbits, ballistic captures, and low-energy transfers. These features are achieved by exploiting the sensitivity in initial conditions of highly nonlinear environments, and open up new scenarios for spacecraft characterized by very limited thrust authority.

In this talk, the tools developed at Politecnico di Milano for high-fidelity trajectory design will be presented. These include ULTIMAT (Ultra Low Thrust Interplanetary Mission Analysis Tool) for design and feasibility assessment of limited control authority missions, GRATIS (GRAvity TIdal Slide) for the computation of ballistic capture orbits, DIRETTO (DIREct collocation Tool for Trajectory Optimization) and LT2O (Low-Thrust Trajectory Optimizer) for the direct and indirect optimization of space trajectories in multi-body models, respectively.

Summary

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