

USING CHAOTICITY MAPS FOR SMALL BODY MISSION DESIGN

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Spacecraft orbit design methodologies for orbiter missions to small asteroids must address unique challenges, including irregular gravitational potential fields (with a priori unknown parameters) and significant perturbation from solar radiation pressure. This talk will review the theory and application of chaoticity indicators to the phase space analysis around asteroids that provide large scale maps that outline different regimes of motion. For example, long term stable regions are shown to exist adjacent to escape boundaries and the role of mean motion resonance are illustrated. Such methods complement the available analytical results used in preliminary mission design by providing more accurate information about the selected target asteroid that cannot be captured by simplified dynamical models. These methods are expected to facilitate the design of small body orbiters and increase the range of mission opportunities available to the designer.