

A simulation software for satellite dynamics and space trajectory visualization

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Abstract

In this paper, an interactive software for simulation of satellites dynamics and autonomous spacecraft guidance and control is presented. Different geopotential models for orbit propagation of Earth-orbiting satellites are provided, which consider Earth's gravitational field with various accuracies. The presented tool is a 3D visualization platform for space orbit simulation with analytical capabilities through various modules. Taking advantage of a graphical user interface, it can evaluate, analyze and illustrate the motion of satellite based on different orbit propagation schemes. Several cases of satellites and autonomous spacecraft in the space rendezvous mission are simulated regarding different propagation models to demonstrate the performance of the application in space mission analysis, ground track visualization and trajectory optimization. Results are validated by comparing with other state-of-the-art tools.

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