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Engineering : Aerospace Technology and Astronautics

Kemble, Stephen

Interplanetary Mission Analysis and Design

- The most up-to-date book focusing entirely on interplanetary mission design for a wide range of space projects
- Describes the very latest and most efficient mission design techniques with details of their practical applications
- Covers a wide range of interplanetary mission design problems with case studies of their use in actual European space mission design scenarios
- Includes relevant mathematical methods and algorithms as they are required in a problem solving context

The book describes current mission analysis and design techniques that may be applied to a very wide range of interplanetary missions from those targeting the inner planets to those destined for the outer planets and Solar System escape trajectories. The early chapters comprise an introduction and a description of the fundamentals of interplanetary missions, aspects of leaving Earth and planet orbit selection and insertion. A discussion of various propulsion systems for interplanetary transfer is followed by a detailed overview of transfer techniques, including the principles of gravity assist and a range of applications of this technique, low-thrust transfers in combination with gravity assist and for planetary escape and capture and the utilisation of multi-body gravity perturbations. The final chapter deals with various optimisation methods for interplanetary missions. The dynamics of the problems are analysed and algorithms that may be used to solve the problems are presented. Practical difficulties that may be encountered are also discussed. The mission design options are considered in the context of spacecraft types, ranging from high thrust, nuclear thermal rockets to low thrust ion propulsion systems. A series of specific examples are described in detail in the appendices, covering 'end-to-end' mission design for some topical space mission scenarios.

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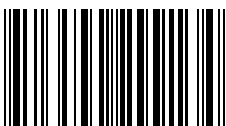
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