

Preface

The orbital transfer vehicle (OTV) is one type of new space vehicle, commonly known as the *Space Shuttle*. Its main task is to transport payloads between different orbits, with the characteristics of long-time space flight, multi-ignition in space, and high autonomy. The whole process from takeoff on carrying launch vehicle until completing orbit maneuver flight is completely and independently controlled.

Combining theoretical research and engineering practice, the book emphatically discusses the analysis, design, and integrated technology of navigation and guidance system of the OTV; and strives to provide theoretical evidence and technical reference for designing OTV navigation and guidance system with the universal models, innovative methods, and practical orbit control strategy.

The book consists of the Basic Knowledge, Navigation, Guidance, and Integrated Applications. The Basic Knowledge part establishes the motional model of the OTV with wide adaptability and describes the orbit prediction methods, which provides evidences for designing navigation and guidance system. The Navigation part illustrates the method of initial alignment, fault diagnosis of inertial devices and reconfiguration, and integrated navigation methods, which provides the information of measurement for guidance and control. The Guidance part, in combination with engineering practice, emphasizes the perturbation, iterative guidance, and midcourse correction technology, which provides control strategy of orbit transfer. The integrated application part takes flight mission as the background and introduces the specific application of the above-mentioned technology in OTV.

During the process of compiling, we have consulted partial documentations both at home and abroad. Hereby, we want to express our sincere appreciations for the authors of these documentations.

All suggestions and improvements are welcome.

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Xuefeng Li
Chaobing Li

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Li, X.; Li, C.

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