1. Record Nr. UNINA9910967130803321

| | |
|---|---|
| Autore | Ben-Asher Joseph Z. <1955-> |
| Titolo | Optimal control theory with aerospace applications / / Joseph Z. Ben-Asher |
| Pubbl/distr/stampa | Reston, Va., : American Institute of Aeronautics and Astronautics, Inc., c2010 |
| ISBN | 1-60086-734-0<br>1-60086-733-2<br>1-61344-043-X |
| Edizione | [1st ed.] |
| Descrizione fisica | xvii, 262 p. : ill |
| Collana | AIAA education series |
| Disciplina | 629.132/6 |
| Soggetti | Automatic pilot (Airplanes)<br>Flight control<br>Guided missiles - Control systems |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Note generali | Bibliographic Level Mode of Issuance: Monograph |
| Nota di bibliografia | Includes bibliographical references and index. |
| Nota di contenuto | Historical background -- Ordinary minimum problems : from the beginning of calculus to Kuhn-Tucker -- Calculus of variations : from Bernoulli to Bliss -- Minimum principle of Pontryagin and Hestenes -- Application of the Jacobi test in optimal control and neighboring extremals -- Numerical techniques for the optimal control problem -- Singular perturbation technique and its application to air-to-space interception -- Application to aircraft performance : Rutowski and Kaiser's techniques and more -- Application to rocket performance : the Goddard problem -- Application to missile guidance : proportional navigation -- Application to time-optimal rotational maneuvers of flexible spacecraft. |
| Sommario/riassunto | Optimal control theory is a mathematical optimization method with important applications in the aerospace industry. This graduate-level textbook is based on the author's two decades of teaching at Tel-Aviv University and the Technion Israel Institute of Technology, and builds upon the pioneering methodologies developed by H.J. Kelley. Unlike other books on the subject, the text places optimal control theory within a historical perspective. Following the historical introduction are |

five chapters dealing with theory and five dealing with primarily aerospace applications. The theoretical section follows the calculus of variations approach, while also covering topics such as gradient methods, adjoint analysis, hodograph perspectives, and singular control. Important examples such as Zermelo's navigation problem are addressed throughout the theoretical chapters of the book. The applications section contains case studies in areas such as atmospheric flight, rocket performance, and missile guidance. The cases chosen are those that demonstrate some new computational aspects, are historically important, or are connected to the legacy of H.J. Kelley.To keep the mathematical level at that of graduate students in engineering, rigorous proofs of many important results are not given, while the interested reader is referred to more mathematical sources. Problem sets are also included.