

Optimal control theory with aerospace applications / Joseph Z. Ben-Asher

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Abstrak

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. 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. Problem sets are also included.