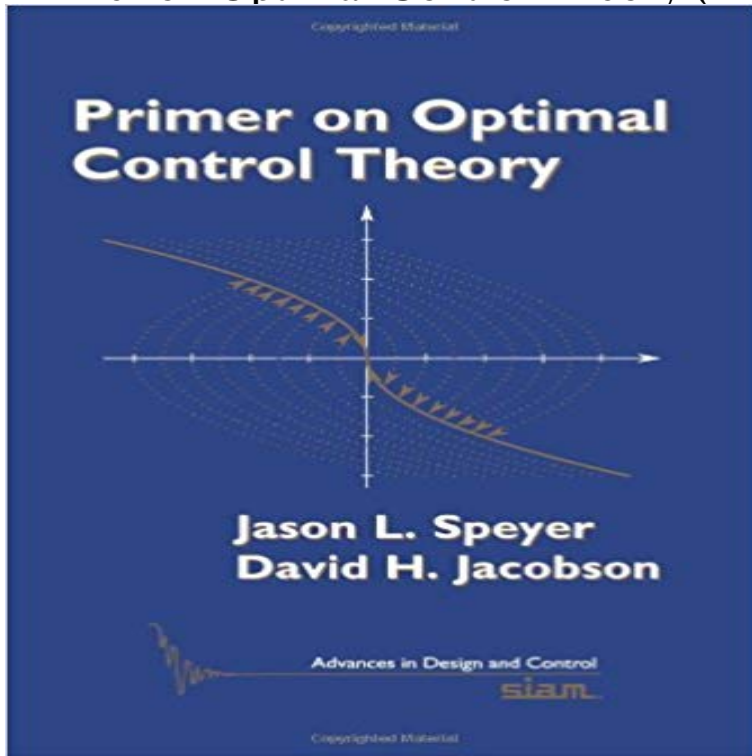


# Primer on Optimal Control Theory (Advances in Design and Control)



The performance of a process for example, how an aircraft consumes fuel can be enhanced when the most effective controls and operating points for the process are determined. This holds true for many physical, economic, biomedical, manufacturing, and engineering processes whose behavior can often be influenced by altering certain parameters or controls to optimize some desired property or output. Primer on Optimal Control Theory provides a rigorous introduction to analyzing these processes and finding the best modes of control and operation for them. It makes optimal control theory accessible to a large class of engineers and scientists who are not mathematicians but have a basic mathematical background and need to understand the sophisticated material associated with optimal control theory. The book presents the important concepts of weak and strong control variations leading to local necessary conditions as well as global sufficiency of Hamilton Jacobi Bellman theory. It also gives the second variation for local optimality where the associated Riccati equation is derived from the transition matrix of the Hamiltonian system. These ideas lead naturally to the development of H<sub>2</sub> and H-infinity synthesis algorithms. Audience: This book will enable applied mathematicians, engineers, scientists, biomedical researchers, and economists to understand, appreciate, and implement optimal control theory at a level of sufficient generality and applicability for most practical purposes and will provide them with a sound basis from which to proceed to higher mathematical concepts and advanced systems formulations and analyses. Contents: List of Figures; Preface; Chapter 1: Introduction; Chapter 2: Finite-Dimensional Optimization; Chapter 3: Systems with General Performance Criteria; Chapter 4: Terminal Equality Constraints; Chapter 5:

Linear-Quadratic Control Problem;  
Chapter 6: Linear-Quadratic Differential  
Games; Appendix: Background;  
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