Optimization of Dynamic Systems (Solid Mechanics and Its Applications)

S. K. Agrawal, B.C. Fabien

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Optimization of Dynamic Systems (Solid Mechanics and Its Applications) S. K. Agrawal, B.C. Fabien This textbook deals with optimization of dynamic systems. The motivation for undertaking this task is as follows: There is an ever increasing need to produce more efficient, accurate, and lightweight mechanical and electromechanical de vices. Thus, the typical graduating B.S. and M.S. candidate is required to have some familiarity with techniques for improving the performance of dynamic systems. Unfortunately, existing texts dealing with system improvement via optimization remain inaccessible to many of these students and practicing en gineers. It is our goal to alleviate this difficulty by presenting to seniors and beginning graduate students practical efficient techniques for solving engineer ing system optimization problems. The text has been used in optimal control and dynamic system optimization courses at the University of Deleware, the University of Washington and Ohio University over the past four years. The text covers the following material in a straightforward detailed manner: • Static Optimization: The problem of optimizing a function that depends on static variables (i.e., parameters) is considered. Problems with equality and inequality constraints are addressed. • Numerical Methods: Static Optimization: Numerical algorithms for the solution of static optimization problems are presented here. The methods presented can accommodate both the unconstrained and constrained static optimization problems. • Calculus of Variation: The necessary and sufficient conditions for the ex tremum of functionals are presented. Both the fixed final time and free final time problems are considered.

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