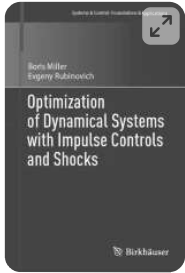


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Optimization of Dynamical Systems with Impulse Controls and Shocks


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Overview

Authors: [Boris Miller](#) , [Evgeny Rubinovitch](#)

Presents the state-of-the-art in the rapidly developing theory of impulse control
Introduces the theory of singular space-time transformations, a new method for studying shock mechanical systems
Considers both traditional and emerging applications

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About this book

This text explores the state-of-the-art in the rapidly developing theory of impulse control and introduces the theory of singular space-time

transformations, a new method for studying shock mechanical systems. Two approaches in the theory of impulse control are presented: The first, more traditional approach defines the impulsive action as a discontinuity of phase coordinates depending on the current time, the state preceding the action, and its magnitude. The second requires the use of modern methods for describing dynamical systems - differential equations with measures. The impulse is treated as an idealization of a very short action of high magnitude, which produces an almost abrupt change of phase coordinates. The relation between these two approaches is also discussed, and several applications, both traditional and emerging, are considered.

This text is intended for graduate students and researchers in control engineering and optimal control theory for dynamical systems. Readers are assumed to be familiar with the theory of ODEs, optimal control, and functional analysis, though an appendix is included that covers many of the necessary mathematical concepts.

Keywords

Impulse control theory

Singular space-time transformations

Shock mechanical systems

Differential equations with measure

Hybrid dynamical systems

Search within this book

 Search

Table of contents (8 chapters)

Front Matter

Pages i–xv

[Download chapter PDF](#) ↓

Introduction

Boris Miller, Evgeny Rubinovich

Pages 1–48

Discrete–Continuous Systems with Impulse Control

Boris Miller, Evgeny Rubinovich

Pages 49–105

Optimal Impulse Control with Constrained Number of Impulses

Boris Miller, Evgeny Rubinovich

Pages 107–158

Generalized Solutions of Nonlinear Differential Equations

Boris Miller, Evgeny Rubinovich

Pages 159–211

Optimal Generalized Solutions in Control Problems

Boris Miller, Evgeny Rubinovich

Pages 213–256

The Maximum Principle in Problems of Generalized Optimal Control

Boris Miller, Evgeny Rubinovich

Pages 257–335

Observation Control in Discrete–Continuous Stochastic Systems

Boris Miller, Evgeny Rubinovich

Pages 337–385

Impulsive Control in Collision Mechanics

Boris Miller, Evgeny Rubinovich

Pages 387–519

Back Matter

Pages 521–624

[Download chapter PDF](#) ↓

Back to top ↑

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Bibliographic Information

Book Title

Optimization of Dynamical Systems with Impulse Controls and Shocks

Authors

Boris Miller, Evgeny Rubinovich

Series Title

Systems & Control: Foundations & Applications

DOI

<https://doi.org/10.1007/978-3-031-64124-4>

Publisher

Birkhäuser Cham

eBook Packages

Mathematics and Statistics, Mathematics and Statistics (R0)

Copyright Information

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Hardcover ISBN

978-3-031-64123-7
Published: 20 September 2024

Softcover ISBN

978-3-031-64126-8
Due: 04 October 2025

eBook ISBN

978-3-031-64124-4
Published: 19 September 2024

Series ISSN

2324-9749

Series E-ISSN

2324-9757

Edition Number

1

Number of Pages

XV, 624

Number of Illustrations

56 b/w illustrations, 14 illustrations in colour

Topics

Systems Theory, Control,
Optimization, Dynamical
Systems and Ergodic
Theory, Vibration,
Dynamical Systems,
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Back to top [↑](#)