

<<拟线性双曲系统的能控性与能观性>>

图书基本信息

书名：<<拟线性双曲系统的能控性与能观性>>

13位ISBN编号：9787040241631

10位ISBN编号：7040241633

出版时间：2010-3

出版时间：李大潜 高等教育出版社 (2010-03出版)

作者：李大潜

页数：222

版权说明：本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问：<http://www.tushu007.com>

前言

The controllability and observability are of great importance in both theory and applications. A complete theory has been established for linear hyperbolic systems, in particular, for linear wave equations. There have also been some results for semilinear wave equations. For quasilinear hyperbolic systems, however, very few results have been published even in the one-space-dimensional (1-D) case. In this monograph based mainly on the results obtained by the author and his collaborators in recent years, by means of the theory on the semi-global classical solution, a simple and direct constructive method is presented in a systematic way to get both the controllability and observability in the framework of classical solutions for general first order 1-D quasilinear hyperbolic systems with general nonlinear boundary conditions, and corresponding applications are given for 1-D quasilinear wave equations and for unsteady flows in a tree-like network of open canals, respectively. This will be of benefit to scholars and graduate students in applied mathematics and in applied sciences. The Appendix given at the end of this monograph is specially written for those readers who are not familiar with quasilinear hyperbolic systems. I would like to take this opportunity to express my sincere thanks to the late professor J.-L. Lions, who initiated and brought me into the area of control theory, for his encouragement and guidance. My special thanks are due to Bopeng Rao, Binyu Zhang, Yi Jin, Lixin Yu, Zhiqiang Wang and Qilong Gu for their kind cooperation in the course of research on this subject, supported by the National Basic Research Program of China (973 Program) (2007CB814800). Finally, I am also indebted to Ms. Chunlian Zhou for her patient and efficient work in editing this book.

## <<拟线性双曲系统的能控性与能观性>>

### 内容概要

The controllability and observability are of great importance in both theory and applications. A complete theory has been established for linear hyperbolic systems, in particular, for linear wave equations. There have also been some results for semilinear wave equations. For quasilinear hyperbolic systems that have numerous applications in mechanics, physics and other applied sciences, however, very few results are available even with space dimension one. This monograph is based mainly on the results obtained by the author and his collaborators in recent years. By means of the theory on the semi-global classical solution, a simple and direct constructive method is presented in a systematic way to get both the controllability and observability in the framework of classical solutions for general first order 1-D quasilinear hyperbolic systems with general nonlinear boundary conditions. Corresponding applications are given for 1-D quasilinear wave equations and for unsteady flows in a tree-like network of open canals, respectively. More than one hundred related references are provided.

This book with 11 chapters is self-contained. An appendix is especially written for those readers who are not familiar with quasilinear hyperbolic systems. This book will be of benefit to scholars and graduate students in applied mathematics and applied sciences. It may be used as a textbook or a main reference for graduate students in corresponding areas.

书籍目录

Introduction  
 1.1 Exact Controllability  
 1.2 Exact Observability  
 1.3 "Duality" Between Controllability and Observability  
 1.4 Exact Boundary Controllability and Exact Boundary Observability for 1-D Quasilinear Wave Equations  
 1.5 Exact Boundary Controllability and Exact Boundary Observability of Unsteady Flows in a Tree-Like Network of Open Canals  
 1.6 Nonautonomous Hyperbolic Systems  
 1.7 Notes on the One-Sided Exact Boundary Controllability and Observability  
 2 Semi-Global C1 Solutions for First Order Quasilinear Hyperbolic Systems  
 2.1 Introduction  
 2.2 Equivalence of Problem I and Problem II  
 2.3 Local C1 Solution to the Mixed Initial-Boundary Value Problem  
 2.4 Semi-Global C1 Solution to the Mixed Initial-Boundary Value Problem  
 2.5 Remarks  
 3 Exact Controllability for First Order Quasilinear Hyperbolic Systems  
 3.1 Introduction and Main Results  
 3.2 Framework of Resolution  
 3.3 Two-Sided Control——Proof of Theorem 3.13  
 3.4 One-Sided Control——Proof of Theorem 3.23  
 3.5 Two-Sided Control with Less Controls——Proof of Theorem 3.33  
 3.6 Exact Controllability for First Order Quasilinear Hyperbolic Systems with Zero Eigenvalues  
 4 Exact Observability for First Order Quasilinear Hyperbolic Systems  
 4.1 Introduction and Main Results  
 4.2 Two-Sided Observation——Proof of Theorem 4.14  
 4.3 One-Sided Observation——Proof of Theorem 4.24  
 4.4 Two-Sided Observation with Less Observed Values——Proof of Theorem 4.34  
 4.5 Exact Observability for First Order Quasilinear Hyperbolic Systems with Zero Eigenvalues  
 4.6 "Duality" Between Controllability and Observability for First Order Quasilinear Hyperbolic Systems  
 5 Exact Boundary Controllability for Quasilinear Wave Equations  
 5.1 Introduction and Main Results  
 5.2 Semi-Global C2 Solution for 1-D Quasilinear Wave Equations  
 5.3 Two-Sided Control——Proof of Theorem 5.15  
 5.4 One-Sided Control——Proof of Theorem 5.25  
 5.5 Remarks  
 6 Exact Boundary Observability for Quasilinear Wave Equations  
 6.1 Introduction  
 6.2 Semi-Global C2 Solution for 1-D Quasilinear Wave Equations ( Continued )  
 6.3 Exact Boundary Observability  
 6.4 "Duality" Between Controllability and Observability for Quasilinear Wave Equations  
 7 Exact Boundary Controllability of Unsteady Flows in a Tree-Like Network of Open Canals  
 7.1 Introduction  
 7.2 Preliminaries  
 7.3 Exact Boundary Controllability of Unsteady Flows in a Single Open Canal  
 7.4 Exact Boundary Controllability for Quasilinear Hyperbolic Systems on a Star-Like Network  
 7.5 Exact Boundary Controllability of Unsteady Flows in a Star-Like Network of Open Canals  
 7.6 Exact Boundary Controllability of Unsteady Flows in a Tree-Like Network of Open Canals  
 7.7 Remarks  
 8 Exact Boundary Observability of Unsteady Flows in a Tree-Like Network of Open Canals  
 8.1 Introduction  
 8.2 Preliminaries  
 8.3 Exact Boundary Observability of Unsteady Flows in a Single Open Canal  
 8.4 Exact Boundary Observability of Unsteady Flows in a Star-Like Network of Open Canals  
 8.5 Exact Boundary Observability of Unsteady Flows in a Tree-Like Network of Open Canals  
 8.6 "Duality" Between Controllability and Observability in a Tree-Like Network of Open Canals  
 9 Controllability and Observability for Nonautonomous Hyperbolic Systems  
 9.1 Introduction  
 9.2 Two-Sided Control  
 9.3 One-Sided Control  
 9.4 Two-Sided Observation  
 9.5 One-Sided Observation  
 9.6 Remarks  
 10 Note on the One-Sided Exact Boundary Controllability for First Order Quasilinear Hyperbolic Systems  
 10.1 Introduction  
 10.2 Reduction of the Problem  
 10.3 Semi-Global C2 Solution to a Class of Second Order Quasilinear Hyperbolic Equations  
 10.4 One-Sided Exact Boundary Controllability for a Class of Second Order Quasilinear Hyperbolic Equations  
 11 Note on the One-Sided Exact Boundary Observability for First Order Quasilinear Hyperbolic Systems  
 11.1 Introduction  
 11.2 Reduction of the Problem  
 11.3 Proof of Theorem 11.11  
 11.4 "Duality" Between Controllability and Observability  
 Appendix A: An Introduction to Quasilinear Hyperbolic Systems  
 A.1 Definition of Quasilinear Hyperbolic System  
 A.2 Characteristic Form of Hyperbolic System  
 A.3 Reducible Quasilinear Hyperbolic System. Riemann Invariants  
 A.4 Blow-Up Phenomenon  
 A.5 Cauchy Problem  
 A.6 Mixed Initial-Boundary Value Problem  
 A.7 Decomposition of Waves  
 References  
 Index

<<拟线性双曲系统的能控性与能观性>>

章节摘录

插图：

## <<拟线性双曲系统的能控性与能观性>>

### 编辑推荐

《拟线性双曲系统的能控性与能观性(英文版)》是由高等教育出版社出版的。

版权说明

本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问:<http://www.tushu007.com>