# Harnessing the Power of Sliding Mode Control: A Comprehensive Guide

Road Map For Sliding Mode Control Design: Springerbriefs In Mathematics is a groundbreaking publication that delves into the intricacies of sliding mode control (SMC),a powerful technique widely used in various engineering applications. The book provides a comprehensive roadmap for designing SMC systems, empowering readers with the knowledge and tools to effectively tackle complex control challenges.

What is Sliding Mode Control?

SMC is a robust and adaptive control strategy that forces the system states to slide along a predefined surface in the state space. This sliding motion ensures that the system quickly converges to the desired state and rejects disturbances. SMC's inherent robustness makes it ideal for controlling systems subject to uncertainties, nonlinearities, and external disturbances.
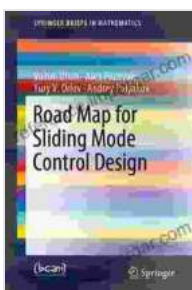
Road Map for Sliding Mode Control Design (SpringerBriefs in Mathematics) by Béla Balázs

⭐⭐⭐⭐⭐ 5 out of 5

Language	: English
File size	: 3956 KB
Screen Reader	: Supported
Print length	: 141 pages

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Key Features of the Book

Road Map For Sliding Mode Control Design offers a comprehensive overview of the fundamental principles and advanced techniques of SMC. Its key features include:

- **Rigorous Mathematical Foundation:** Provides a solid grounding in the theoretical basis of SMC, enabling readers to understand the underlying concepts and derive control laws.

- **Practical Design Guidelines:** Presents step-by-step design procedures for SMC systems, ensuring successful implementation and optimal performance.

- **Comprehensive Case Studies:** Explores real-world applications of SMC in various fields, showcasing its effectiveness and versatility.

- **Extensive Simulation Examples:** Includes numerous MATLAB simulations that illustrate the concepts discussed, facilitating understanding and practical implementation.

Target Audience

Road Map For Sliding Mode Control Design is an invaluable resource for:

- Control engineers and researchers seeking to expand their knowledge and skills in SMC.

- Graduate students pursuing advanced studies in control theory and applications.

- Practicing engineers in industry who require a comprehensive guide to designing and implementing SMC systems.

Book Chapters

The book is organized into six comprehensive chapters:

1. **:** Introduces the basics of SMC, including its advantages, applications, and limitations.

2. **Mathematical Preliminaries:** Provides the necessary mathematical background, including set theory, differential equations, and stability analysis.

3. **Lyapunov-Based Design:** Explores the most common design approach for SMC systems, using Lyapunov's direct method to ensure stability.

4. **Geometric Design:** Presents alternative design methods based on geometric principles, such as invariance sets and sliding manifolds.

5. **Adaptive Sliding Mode Control:** Investigates adaptive SMC techniques that automatically adjust control parameters to handle uncertainties and disturbances.

6. **Applications and Case Studies:** Demonstrates the practical applications of SMC in various fields, including robotics, power electronics, and automotive systems.

Benefits of Reading

By delving into the concepts and techniques presented in *Road Map For Sliding Mode Control Design*, readers will:

- Gain a comprehensive understanding of the foundations and advanced aspects of SMC.

- Develop the ability to design and implement robust and effective SMC systems.

- Acquire practical knowledge through real-world case studies and simulation exercises.

- Stay abreast of the latest developments in the field of sliding mode control.

- Excel in research and development projects involving SMC applications.

Road Map For Sliding Mode Control Design is an indispensable resource for anyone seeking to master the art of SMC. Its comprehensive and rigorous approach empowers readers with the knowledge and tools to tackle complex control challenges and achieve optimal system performance. Whether you are a seasoned control engineer or a researcher aspiring to push the boundaries of SMC, this book is your roadmap to success.
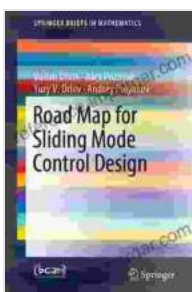
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