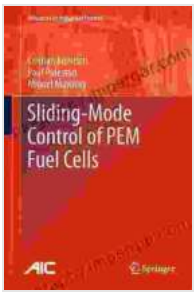
Sliding Mode Control of PEM Fuel Cells: Advances in Industrial Control



Sliding-Mode Control of PEM Fuel Cells (Advances in Industrial Control)

★★★★★ 5 out of 5

Language	: English
File size	: 8357 KB
Text-to-Speech	: Enabled
Screen Reader	: Supported
Enhanced typesetting	: Enabled
Print length	: 289 pages

Proton exchange membrane fuel cells (PEMFCs) are a promising technology for clean and efficient power generation. However, PEMFCs are complex systems that can be difficult to control. Sliding mode control (SMC) is a robust control technique that has been shown to be effective for controlling PEMFCs.

This book provides a comprehensive overview of SMC for PEMFCs. It covers the latest advances in SMC for PEMFCs, including modeling, simulation, and experimental results. The book also discusses the application of SMC to PEMFCs in various industrial applications, such as automotive, aerospace, and power generation.

Modeling and Simulation of PEMFCs

The first step in designing a SMC controller for a PEMFC is to develop a model of the system. This model can be used to simulate the behavior of the PEMFC and to design the controller parameters.

There are a variety of different models that can be used to represent a PEMFC. The most common type of model is the lumped-parameter model. This type of model represents the PEMFC as a series of interconnected compartments. Each compartment represents a different part of the PEMFC, such as the anode, the cathode, and the membrane.

Lumped-parameter models are relatively simple to develop and can be used to simulate the behavior of PEMFCs under a wide range of operating conditions. However, lumped-parameter models can be inaccurate at high frequencies.

For more accurate simulations, it is necessary to use a distributed-parameter model. This type of model represents the PEMFC as a continuous system. Distributed-parameter models are more complex to develop than lumped-parameter models, but they can provide more accurate simulations of the PEMFC's behavior.

Sliding Mode Control of PEMFCs

Once a model of the PEMFC has been developed, it can be used to design a SMC controller. SMC is a robust control technique that is based on the principle of sliding mode. Sliding mode is a type of dynamic behavior in which the system's state is constrained to a sliding surface.

The sliding surface is designed to ensure that the system's state converges to the desired operating point. The SMC controller is designed to drive the

system's state to the sliding surface and to keep it there.

SMC has a number of advantages over other control techniques. SMC is robust to disturbances and uncertainties in the system model. SMC can also be used to control systems with nonlinear dynamics.

Applications of SMC to PEMFCs

SMC has been used to control PEMFCs in a variety of industrial applications. These applications include:

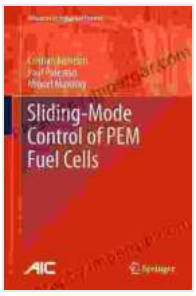
* Automotive: SMC has been used to control PEMFCs in automotive applications, such as fuel cell vehicles. SMC can be used to control the PEMFC's power output, efficiency, and emissions. * Aerospace: SMC has been used to control PEMFCs in aerospace applications, such as unmanned aerial vehicles (UAVs). SMC can be used to control the PEMFC's power output and efficiency at high altitudes. * Power generation: SMC has been used to control PEMFCs in power generation applications, such as stationary power plants. SMC can be used to control the PEMFC's power output, efficiency, and reliability.

SMC is a powerful control technique that can be used to control PEMFCs in a variety of industrial applications. This book provides a comprehensive overview of SMC for PEMFCs, including modeling, simulation, and experimental results. The book also discusses the application of SMC to PEMFCs in various industrial applications.

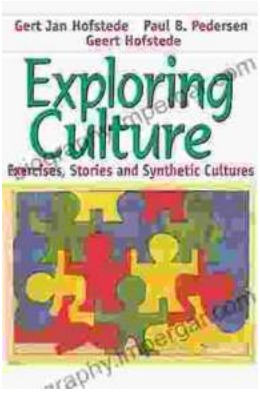
Sliding-Mode Control of PEM Fuel Cells (Advances in Industrial Control)

★★★★★ 5 out of 5

Language : English

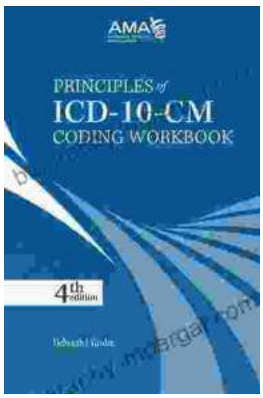


File size	: 8357 KB
Text-to-Speech	: Enabled
Screen Reader	: Supported
Enhanced typesetting	: Enabled
Print length	: 289 pages



Exploring Culture: Exercises, Stories, and Synthetic Cultures

Culture is a complex and multifaceted concept that shapes our lives in countless ways. It influences our beliefs, values, behaviors, and even our physical appearance. In...



Principles of ICD-10 Coding Workbook: Your Comprehensive Guide to Accurate and Efficient Medical Documentation

Empower Yourself with the Knowledge and Skills for Expert ICD-10 Coding In today's healthcare landscape, accurate and efficient medical coding is...