Chakraverty / Mohapatra

Artificial Intelligence Modeling for Dynamical Problems

Artificial Intelligence Modeling for Dynamical Problems provides a comprehensive exploration of AI-driven methodologies tailored to address the intricate challenges posed by dynamical systems. The chapters in this book delve into cutting-edge techniques, including scientific machine learning, operator learning, fuzzy logic, and optimization algorithms, highlighting their applications in structural dynamics, fluid dynamics, robotics, and wave dynamics. Readers will gain insights into innovative state-of-the-art approaches such as Physics-Informed Neural Networks (PINNs) for precise navigation and control in autonomous vehicles, convolutional neural networks (CNNs) for frequency dynamics recognition, and data-driven models for market sentiment analysis. Additionally, the book explores the role of uncertainty modeling, statistical inference, and hybrid AI techniques, such as Type-2 fuzzy fractional modeling, in advancing the field of dynamical system analysis. Each chapter combines foundational principles with practical applications, including recent investigations, making it a valuable resource for researchers, practitioners, students of STEM seeking to apply theoretical AI models to real-world dynamical problems.

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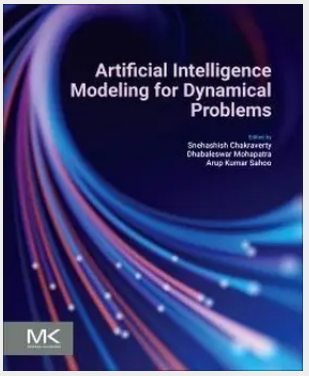

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