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Automatic Control Systems
Novel Theoretical Contributions

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This monograph presents recent theoretical advances in the design of automatic control systems operating under uncertainty. Its central contribution lies in developing innovative and efficient methods that address modern control challenges while relying on realistic assumptions about unknown or variable system parameters. Some problems are solved using minimal, practically accessible information represented as sets of possible values; others use fuzzy approximations of probabilistic characteristics, or classical stochastic assumptions when useful statistical data are available. These differing perspectives shape the analytical tools and control strategies proposed throughout the work.

The methods are applied to a broad range of control and estimation tasks. Key technical applications involve the control of mobile systems such as marine vehicles, spacecraft, and robotic platforms. Beyond engineering, the book explores the application of automatic control techniques in biology, medicine, and other fields critical to human life. The monograph also highlights the growing role of information technologies, artificial intelligence, and machine learning in addressing uncertainty across these domains.

The material is structured into two complementary parts: (1) Theory of Conflict and Guaranteed Control and Estimation, and (2) Intelligent, Adaptive, and Optimal Control, offering a unified view of theoretical foundations and intelligent solutions to uncertain control problems.

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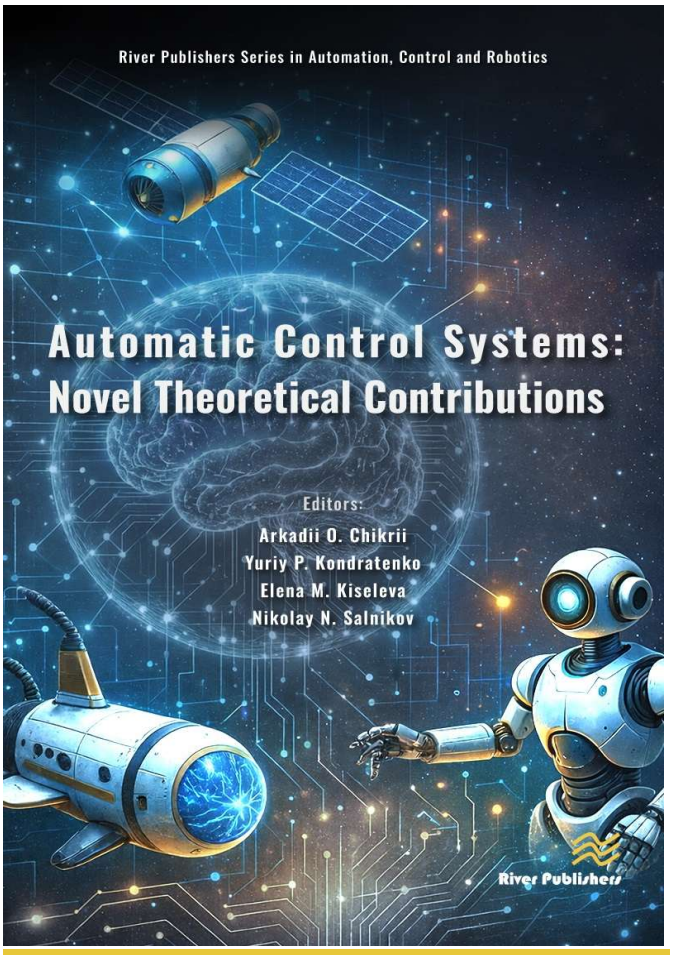

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