

Automatic Control Systems Novel Theoretical Contributions

Editors:

Arkadii O. Chikrii, Glushkov Institute of Cybernetics of NAS of Ukraine, Ukraine, Yuriy Fedkovich Chernivtsi National University, Ukraine.

Yuriy P. Kondratenko, Petro Mohyla Black Sea National University, Institute of Artificial Intelligence Problems of Ministry of Education and Science and National Academy of Sciences of Ukraine, Ukraine

Olena (Elena) M. Kiseleva, Oles Honchar Dnipro National University, Faculty of Applied Mathematics and Information Technologies, Ukraine

Mykola M. (Nikolay N.) Salnikov, Space Research Institute of the National Academy of Sciences of Ukraine and the State Space Agency of Ukraine, Dynamical System Control Dept., Kyiv, Ukraine

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.

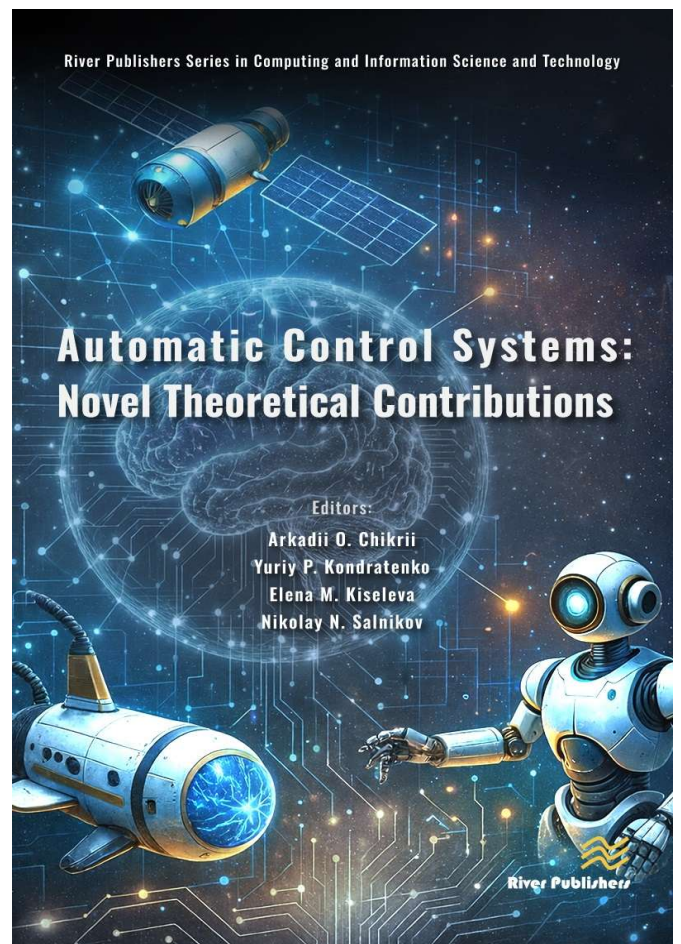
The methods are applied to a broad range of control and estimation tasks. Key technical applications involve the control of mobile systems such as marine vehicles, spacecraft, and robotic platforms. Beyond engineering, the book explores the application of automatic control techniques in biology, medicine, 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.

TABLE OF CONTENTS

Part 1. Theory of Conflict and Guaranteed Control and Estimation

- 1 Game Tasks for Intercepting Guided Targets
 - 2 Global Problem of Trajectories Avoidance for Nonlinear Conflict Controlled Systems
 - 3 The Method of Upper and Lower Solving Functions in the Theory of Conflict-controlled Processes
 - 4 Stochastic Differential Games in Sobolev Retarded Systems
 - 5 Group Differential-Difference Game of Approach for Different Inertia Objects
 - 6 Time Dilation Principle to Solve Complex Game Dynamic Problems of Control
 - 7 Decentralized Load Balancing Consensus Control in Distributed Computing Systems with Unknown but Bounded Delays
 - 8 Mathematical Model of Control with Guaranteed Accuracy Under Uncertain Disturbances
 - 9 ?n Extension of an Adaptive Approach to Automatic Control System Design in the Presence of Nonstochastic Uncertainties
 - 10 Modified Ellipsoidal Estimation Method and its Properties
 - 11 Estimation of the Motion Parameters of an Uncooperative Space Object by the Measurements of Orientation and Distance
- Part 2. Intelligent, Adaptive and Optimal Control
- 12 Reinforcement Learning Algorithms for Intelligent Control in Cyber??Physical Systems: Theoretical Foundations and Applications
 - 13 Artificial Neural Networks in Describing States of Descriptor Systems
 - 14 On the Simplest Dynamic Problem of Optimal Set Partitioning
 - 15 Fuzzy Control System for the Forging Processes of a Ship Engine Crankshaft
 - 16 Identification of Adaptive Control Model Parameters Based on Observation Results
 - 17 Applying Artificial Intelligence Methods for Solving Two-stage Logistic Problems under Uncertainty
 - 18 An Algorithm for Solving Continuous Optimal Set Partitioning Problems Using Cluster Analysis Methods
 - 19 Synthesis of Robust-Optimal Control Systems for Marine Vehicles



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Automatic control systems, conflict controlled systems, estimation, guaranteed control, intelligent control, adaptive control, optimal control



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