

Advances in Applied Self-Organizing Systems

How do we design a self-organizing system? Is it possible to validate and control non-deterministic dynamics? What is the right balance between the emergent patterns that bring robustness, adaptability and scalability, and the traditional need for verification and validation of the outcomes?

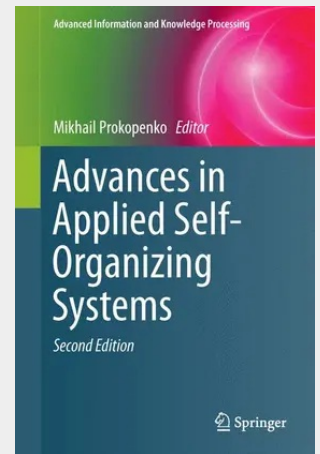
The last several decades have seen much progress from original ideas of "emergent functionality" and "design for emergence", to sophisticated mathematical formalisms of "guided self-organization". And yet the main challenge remains, attracting the best scientific and engineering expertise to this elusive problem.

This book presents state-of-the-practice of successfully engineered self-organizing systems, and examines ways to balance design and self-organization in the context of applications.

As demonstrated in this second edition of *Advances in Applied Self-Organizing Systems*, finding this balance helps to deal with practical challenges as diverse as navigation of microscopic robots within blood vessels, self-monitoring aerospace vehicles, collective and modular robotics adapted for autonomous reconnaissance and surveillance, self-managing grids and multiprocessor scheduling, data visualization and self-modifying digital and analog circuitry, intrusion detection in computer networks, reconstruction of hydro-physical fields, traffic management, immunocomputing and nature-inspired computation.

Many algorithms proposed and discussed in this volume are biologically inspired, and the reader will also gain an insight into cellular automata, genetic algorithms, artificial immune systems, snake-like locomotion, ant foraging, birds flocking, neuromorphic circuits, amongst others. Demonstrating the practical relevance and applicability of self-organization, *Advances in Applied Self-Organizing Systems* will be an invaluable tool for advanced students and researchers in a wide range of fields.

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