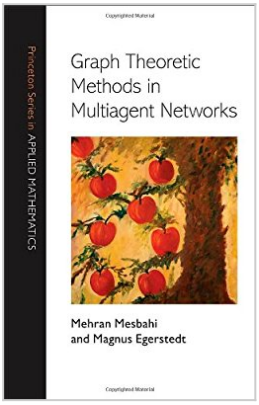

Graph Theoretic Methods in Multiagent Networks (Princeton Series in Applied Mathematics)

By Mehran Mesbahi, Magnus Egerstedt

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This accessible book provides an introduction to the analysis and design of dynamic multiagent networks. Such networks are of great interest in a wide range of areas in science and engineering, including: mobile sensor networks, distributed robotics such as formation flying and swarming, quantum networks, networked economics, biological synchronization, and social networks. Focusing on graph theoretic methods for the analysis and synthesis of dynamic multiagent networks, the book presents a powerful new formalism and set of tools for networked systems.

The book's three sections look at foundations, multiagent networks, and networks as systems. The authors give an overview of important ideas from graph theory, followed by a detailed account of the agreement protocol and its various extensions, including the behavior of the protocol over undirected, directed, switching, and random networks. They cover topics such as formation control, coverage, distributed estimation, social networks, and games over networks. And they explore intriguing aspects of viewing networks as systems, by making these networks amenable to control-theoretic analysis and automatic synthesis, by monitoring their dynamic evolution, and by examining higher-order interaction models in terms of simplicial complexes and their applications.

The book will interest graduate students working in systems and control, as well as in computer science and robotics. It will be a standard reference for researchers seeking a self-contained account of system-theoretic aspects of multiagent networks and their wide-ranging applications.

This book has been adopted as a textbook at the following universities:

- University of Stuttgart, Germany
- Royal Institute of Technology, Sweden
- Johannes Kepler University, Austria
- Georgia Tech, USA
- University of Washington, USA

- Ohio University, USA

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Editorial Review

Review
"Presently, there are few books on multiagent systems. Thus, this book can be a useful reference book for graduate students and researchers focusing on systems, controls, and robotics, and help them to better know and study multiagent systems."**--Long Wang,** ***Mathematical Reviews***

From the Back Cover

"This well-organized book is an extensive and complete introduction to graph theoretic methods in the context of multiagent and multivehicle cooperative networks. The presentation of the material is elegant and in addition to basic results, the book includes new topics not commonly found in the literature. Ideal for graduate students and researchers, the book represents a significant contribution to the emerging field of cooperative control and consensus."**--Randy Beard, Brigham Young University**

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About the Author
Mehran Mesbahi is associate professor of aeronautics and astronautics at the University of Washington. Magnus Egerstedt is associate professor of electrical and computer engineering at Georgia Institute of Technology.

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