

**Jan Lunze**

# Feedback Control of Large-Scale Systems

**Structure of interconnected systems**

**Decentralized control**

**Symmetric composite systems**

The original motivation to investigate interconnected systems and decentralized controllers resulted from the impossibility to connect geographically distributed systems by reliable communication links three decades ago. Energy or water distribution networks have been studied to answer the question: Which control tasks can be accomplished by a set of local feedback controllers where each control station has access only to the inputs and the outputs of the associated subsystem.

The revival of interest in large-scale systems in the recent years came with the availability of modern digital communication networks. The question is now: Which information links are necessary to ensure a satisfactory performance of the overall system. The results on decentralized control can help to answer this question by showing the capabilities and the limits of feedback structures that have to satisfy structural constraints.

This reprint of a monograph gives a survey of the analysis methods of large-scale systems and the design methods for decentralized controllers, which can be used as a starting point for the investigation of networked control systems.

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- Decentralized servomechanism problem
- Optimal decentralized control
- Stability analysis of interconnected systems
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- Decentralized control of weakly coupled systems
- Strongly coupled symmetric composite systems

**Prof. Dr.-Ing. Jan Lunze** is head of the Institute of Automation and Computer Control at Ruhr-University Bochum, Germany. He is the author of several textbooks on control theory, discrete-event systems and artificial intelligence. His experience from industrial projects has led to several examples of this book that demonstrate dynamical phenomena in large-scale systems.



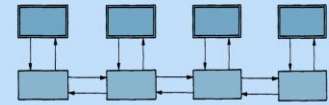
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