A hands-on approach to understanding, designing, analyzing, and evaluating complex systems

During the last few years, Simulation-Based Systems Engineering (SBSE) has become an essential tool for the design and evaluation of complex systems. This is the first book to cover the basic principles of complex systems through the use of hands-on experimentation using an icon-based simulation tool.

Utilizing the accompanying software tool ExtendSim, which works with the OpEMCSS library, readers are invited to engage in simulation-based experiments that demonstrate the principles of complex systems with an emphasis on design, analysis, and evaluation. A number of real-world examples are included to demonstrate how to model complex systems across a range of engineering, business, societal, economic, and scientific disciplines.

Beginning with an introduction to SBSE, the book covers:

- Simulation concepts and building blocks
Systems design and model development

- Markov model development

- Reliability processes

- Queuing theory in SBSE

- Rule-based learning and adaptation

- Agent motion and spatial interactions

- Multi-agent system of systems

Assuming only a very basic background in problem-solving ability, this book is ideal as a textbook for students (a homework solution manual is also available) and as a reference book for practitioners in industry.

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