



# Modeling and Simulation Fundamentals: Theoretical Underpinnings and Practical Domains

By John A. Sokolowski, Catherine M. Banks

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**An insightful presentation of the key concepts, paradigms, and applications of modeling and simulation**

Modeling and simulation has become an integral part of research and development across many fields of study, having evolved from a tool to a discipline in less than two decades. *Modeling and Simulation Fundamentals* offers a comprehensive and authoritative treatment of the topic and includes definitions, paradigms, and applications to equip readers with the skills needed to work successfully as developers and users of modeling and simulation.

Featuring contributions written by leading experts in the field, the book's fluid presentation builds from topic to topic and provides the foundation and theoretical underpinnings of modeling and simulation. First, an introduction to the topic is presented, including related terminology, examples of model development, and various domains of modeling and simulation. Subsequent chapters develop the necessary mathematical background needed to understand modeling and simulation topics, model types, and the importance of visualization. In addition, Monte Carlo simulation, continuous simulation, and discrete event simulation are thoroughly discussed, all of which are significant to a complete understanding of modeling and simulation. The book also features chapters that outline sophisticated methodologies, verification and validation, and the importance of interoperability. A related FTP site features color representations of the book's numerous figures.

*Modeling and Simulation Fundamentals* encompasses a comprehensive study of the discipline and is an excellent book for modeling and simulation courses at the upper-undergraduate and graduate levels. It is also a valuable reference for researchers and practitioners in the fields of computational statistics, engineering, and computer science who use statistical modeling techniques.

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#### Review

"This text provides a well-designed overview of M&S as a discipline useful for graduate students with engineering, mathematics or computer science background and for specialists interested in fundamental principles of M&S, its further development and applications." (*Zentralblatt MATH*, 2010)

#### From the Back Cover

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#### About the Author

**JOHN A. SOKOLOWSKI**, PhD, is Research Professor and Director of Research at the Virginia Modeling, Analysis and Simulation Center at Old Dominion University. He is the coeditor of *Principles of Modeling and Simulation: A Multidisciplinary Approach* and coauthor of *Modeling and Simulation for Analyzing Global Events*, both published by Wiley. Dr. Sokolowski currently focuses his research on computational modeling of human and social behavior.

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