



Numerical Methods in Finance and Economics: A MATLAB-Based Introduction

By Paolo Brandimarte

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A state-of-the-art introduction to the powerful mathematical and statistical tools used in the field of finance

The use of mathematical models and numerical techniques is a practice employed by a growing number of applied mathematicians working on applications in finance. Reflecting this development, *Numerical Methods in Finance and Economics: A MATLAB-Based Introduction, Second Edition* bridges the gap between financial theory and computational practice while showing readers how to utilize MATLAB--the powerful numerical computing environment--for financial applications.

The author provides an essential foundation in finance and numerical analysis in addition to background material for students from both engineering and economics perspectives. A wide range of topics is covered, including standard numerical analysis methods, Monte Carlo methods to simulate systems affected by significant uncertainty, and optimization methods to find an optimal set of decisions.

Among this book's most outstanding features is the integration of MATLAB, which helps students and practitioners solve relevant problems in finance, such as portfolio management and derivatives pricing. This tutorial is useful in connecting theory with practice in the application of classical numerical methods and advanced methods, while illustrating underlying algorithmic concepts in concrete terms.

Newly featured in the Second Edition:

- * In-depth treatment of Monte Carlo methods with due attention paid to variance reduction strategies
- * New appendix on AMPL in order to better illustrate the optimization models in Chapters 11 and 12
- * New chapter on binomial and trinomial lattices
- * Additional treatment of partial differential equations with two space dimensions
- * Expanded treatment within the chapter on financial theory to provide a more thorough background for engineers not familiar with finance

* New coverage of advanced optimization methods and applications later in the text

Numerical Methods in Finance and Economics: A MATLAB?-Based Introduction, Second Edition presents basic treatments and more specialized literature, and it also uses algebraic languages, such as AMPL, to connect the pencil-and-paper statement of an optimization model with its solution by a software library. Offering computational practice in both financial engineering and economics fields, this book equips practitioners with the necessary techniques to measure and manage risk.

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Editorial Review

Review

"Inquisitive statisticians may find this book an interesting read in which to put their theories and epistemology to the test." (*Journal of American Statistics*, 2008)

"In summary, this book is a "must have" for professionals and researchers who employ numerical methods in economic and financial modeling. The amount and quality of the material that the author offers is so generous that readers are likely to benefit from it even if they are not interested in some of the specific applications presented." (*Interfaces*, June 2008)

"...a broad and enjoyable introduction to computational finance." (*Journal of the American Statistical Association*, December 2007)

"...written in such a lucid way that it provides great pleasure in reading...excellent for students...of great value to practitioners who are new to the field." (*MAA Reviews*, November 23, 2006)

From the Back Cover

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About the Author

PAOLO BRANDIMARTE is Professor of Quantitative Methods for Finance and Logistics at Politecnico di Torino in Italy. He is the author of several publications, including five books, on the application of optimization and simulation to diverse areas such as production management, telecommunications, and finance. Dr. Brandimarte has extensive teaching experience in engineering and economics faculties, including master's and PhD-level courses.

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