

## FINANCIAL ENGINEERING AND COMPUTATION

During the past decade many sophisticated mathematical and computational techniques have been developed for analyzing financial markets. Students and professionals intending to work in any area of finance must not only master advanced concepts and mathematical models but must also learn how to implement these models computationally. This comprehensive text combines a thorough treatment of the theory and mathematics behind financial engineering with an emphasis on computation, in keeping with the way financial engineering is practiced in today's capital markets.

Unlike most books on investments, financial engineering, or derivative securities, the book starts from basic ideas in finance and gradually builds up the theory. The advanced mathematical concepts needed in modern finance are explained at accessible levels. Thus it offers a thorough grounding in the subject for MBAs in finance, students of engineering and sciences who are pursuing a career in finance, researchers in computational finance, system analysts, and financial engineers.

Building on the theory, the author presents algorithms for computational techniques in pricing, risk management, and portfolio management, together with analyses of their efficiency. Pricing financial and derivative securities is a central theme of the book. A broad range of instruments is treated: bonds, options, futures, forwards, interest rate derivatives, mortgage-backed securities, bonds with embedded options, and more. Each instrument is treated in a short, self-contained chapter for ready reference use.

Many of these algorithms are coded in Java as programs for the Web, available from the book's home page: [www.csie.ntu.edu.tw/~lyuu/Capitals/capitals.htm](http://www.csie.ntu.edu.tw/~lyuu/Capitals/capitals.htm). These programs can be executed on Windows, MacOS, or Unix platforms.

Yuh-Dauh Lyuu received his Ph.D. in computer science from Harvard University. His past positions include Member of Technical Staff at Bell Labs, Research Scientist at NEC Research Institute (Princeton), and Assistant Vice President at Citicorp Securities (New York). He is currently Professor of Computer Science and Information Engineering and Professor of Finance, National Taiwan University. His previous book is *Information Dispersal and Parallel Computation*.

Professor Lyuu has published works in both computer science and finance. He also holds a U.S. patent. Professor Lyuu received several awards for supervising outstanding graduate students' theses.



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Principles, Mathematics, Algorithms

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**CAMBRIDGE**  
UNIVERSITY PRESS

PUBLISHED BY THE PRESS SYNDICATE OF THE UNIVERSITY OF CAMBRIDGE  
The Pitt Building, Trumpington Street, Cambridge, United Kingdom

CAMBRIDGE UNIVERSITY PRESS  
The Edinburgh Building, Cambridge CB2 2RU, UK  
40 West 20th Street, New York, NY 10011-4211, USA  
477 Williamstown Road, Port Melbourne, VIC 3207, Australia  
Ruiz de Alarcón 13, 28014 Madrid, Spain  
Dock House, The Waterfront, Cape Town 8001, South Africa

<http://www.cambridge.org>

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First published in printed format 2002

ISBN 978-0-511-54683-9 OCeISBN  
ISBN 0-521-78171-X hardback

*In Loving Memory of RACHEL and JOSHUA*

