

Numerical Methods in Quantitative Trading

By

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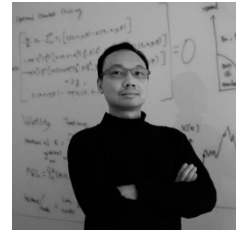
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About the Authors



Dr. Haksun Li is a founder and the CEO of Numerical Method Incorporation Limited, a quantitative trading research and a mathematics modelling/consulting company. The company serves brokerage houses and funds all over the world, multinational corporations, very high net worth individuals and gambling groups. Prior to this, Haksun was a quantitative trader/quantitative analyst with multiple investment banks. He has worked in New York, London, Tokyo, Singapore and Hong Kong. Dr. Haksun Li has a B.S. and M.S. in Pure and Financial Mathematics from the University of Chicago, an M.S. and a Ph.D. in Computer Science & Engineering from the University of Michigan, Ann Arbor.

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Preface

This book began in 2006 on a rainy day when I rushed from Stamford CT to Manhattan NYC to meet Mr. Eric Auld for an interview with a position in algorithmic trading. I am forever grateful that Eric has hired me into his then young and thriving team to build an automated trading system from scratch. He opened my eyes and filled me with a lot of knowledge that I would not otherwise have access to by sending me to New York, Tokyo, London, Paris, and Singapore to learn from the best mathematicians in BNP Paribas. What they have taught me has changed my life ever since. I saw for the first time that mathematics is so powerful in modeling, explaining, forecasting and solving real life problems; and that computer programming is such an essential skill to conduct effective research and materialization of ideas. Despite having a few degrees in mathematics and computer science, I had never known that the combination of the two can be so powerful and, of course, rewarding. This is what I am best at doing and love doing most. So I have since made quantitative trading my life time career.

My job afforded me a lot of freedom in learning mathematics, quantitative trading strategies, research results and systems, as well as, hiring members into the team. I was very lucky to hire Dr. Ken Yiu in 2007, starting out as an intern then full time and now a co-founder of the startup. Ken is the best software engineer that I have ever known. He is smart, quick-wit, careful and above all responsible. He has created all our analytic libraries and systems. I cannot thank him enough for travelling with me through this adventure of learning and building trading strategies and systems, in spite of all the ups and downs and uncertainties. He has taught me a lot about computer science and programming.

In 2008, Dr. Kevin Sun joined the team as an intern. I was very fortunate to have Kevin later join the startup as another co-founder. He is now the brain behind our team and is the key person to creating many mathematical models in trading and gambling. He has excellent mathematical thinking and problem solving skill. I am still impressed how he could back then (and still can) solve just about every problem we threw at him in a nice and elegant way. He always saves the team before deadlines with his incredible math and R skills. He has taught me a lot about mathematics and statistics.

This is a curious book. Most authors write about the subjects that they know or at least that they believe that they know. This book is about things we have picked up during our journey of learning quantitative trading. In the past years, we have been reading a lot of books and papers, as well as talking to a lot of people in the industry and academics to collect intelligence. We have explored many trading ideas, improved them, coded them up in simulations and tested them out live. This book is not about teaching you how to make money. If you are still with me after reading the last sentence, the goal is to share with you our experience and knowledge that we find

useful in quantitative trading. It is a summary of our journey in the last decade in search for the “truth”¹ in quantitative wealth management.

This book emerges out of the lecture notes that I used when teaching quantitative or algorithmic trading at universities – National University of Singapore, Department of Mathematics, Master of Science in Quantitative Finance; Nanyang Technological University, Business School, Master of Science in Financial Engineering; the Hong Kong University of Science & Technology, Department of Mathematics, Master of Science in Financial Mathematics; and Fu Dan University, Department of Economics. I thank Prof. Lee Seng Luan (NUS), Prof. Charoenwong Charlie (NTU), Prof. Kwok Yue Kuen (HKUST) as well as Prof. Liu Qing Fu (Fu Dan) for hiring me into the teaching positions.

Last but not least, our startup, hence this book, would not be possible without the patronage of our customers. Our gratitude goes to all of them for their financial supports, most notably Dr. Kevin Sun, Mr. Patrick Huen, and Mr. John Webb.

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[TODO: Ken’s Preface]

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¹ In the sense of (Chincarini & Kim, 2006).