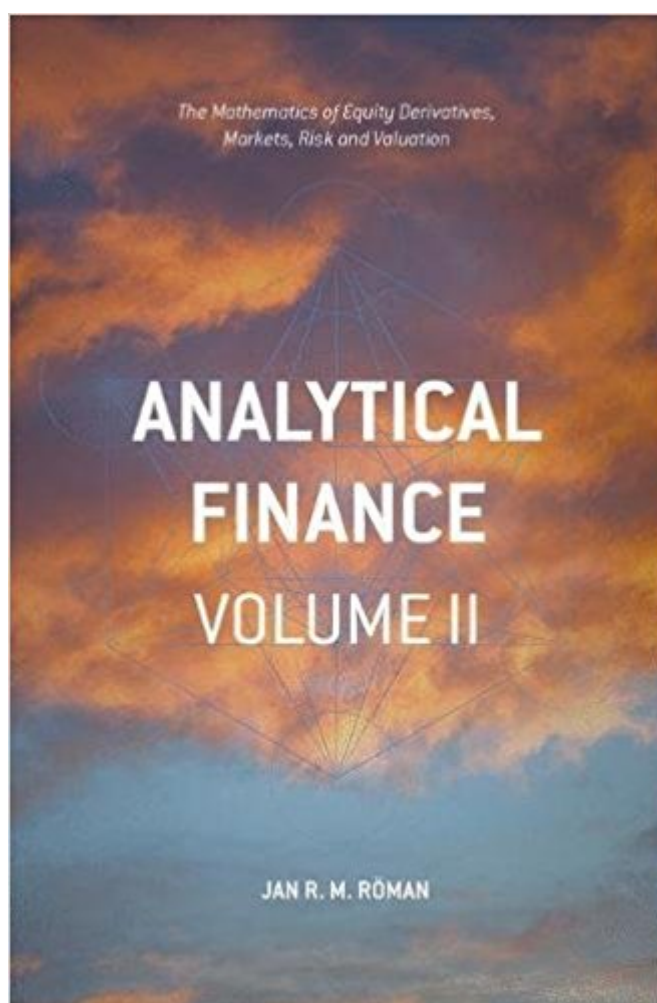


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Analytical Finance: Volume II: The Mathematics Of Interest Rate Derivatives, Markets, Risk And Valuation



Synopsis

Analytical Finance is a comprehensive introduction to the financial engineering of equity and interest rate instruments for financial markets. Developed from notes from the author's many years in quantitative risk management and modeling roles, and then for the Financial Engineering course at MIT Sloan School of Management, it provides exhaustive coverage of vanilla and exotic mathematical finance applications for trading and risk management, combining rigorous theory with real market application. Coverage includes:

- Date arithmetic, quote types of interest rate instruments
- The interbank market and reference rates, including negative rates
- Valuation and modeling of IR instruments; bonds, FRN, FRA, forwards, futures, swaps, CDS, caps/floors and others
- Bootstrapping and how to create interest rate curves from prices of traded instruments
- Risk measures of IR instruments
- Option Adjusted Spread and embedded options
- The term structure equation, martingale measures and stochastic processes of interest rates; Vasicek, Ho-Lee, Hull-White, CIR
- Numerical models; Black-Derman-Toy and forward induction using Arrow-Debreu prices and Newton-Raphson in 2 dimension
- The Heath-Jarrow-Morton framework
- Forward measures and general option pricing models
- Black log-normal and, normal model for derivatives, market models and managing exotics instruments
- Pricing before and after the financial crisis, collateral discounting, multiple curve framework, cheapest-to-deliver curves, CVA, DVA and FVA

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Analytical Finance is a comprehensive introduction to the financial engineering of equity and interest rate instruments for financial markets. Developed from notes from the author's many years in quantitative risk management and modeling roles, and then for the Financial Engineering course at Malardalen University, it provides exhaustive coverage of vanilla and exotic mathematical finance applications for trading and risk management, combining rigorous theory with real market application.

Volume I – Equity Derivatives Markets, Valuation and Risk Management. Coverage includes: The fundamentals of stochastic processes used in finance including the change of measure with Girsanov transformation and the fundamentals of probability theory. Discrete time models, such as various binomial models and numerical solutions to Partial Differential Equations (PDEs) Monte-Carlo simulations and Value-at-Risk (VaR) Continuous time models, such as Black-Scholes-Merton and similar with extensions Arbitrage theory in discrete and continuous time models

Volume II – Interest Rate Derivative Markets, Valuation and Risk Management Coverage includes: Interest Rates including negative interest rates Valuation and model most kinds of IR instruments and their definitions. Bootstrapping; how to create an interest curve from prices of traded instruments. The multi curve framework and collateral discounting Difference of bootstrapping for trading and IR Risk Models and risk with positive and negative interest rates. Risk measures of IR instruments Option Adjusted Spread and embedded optionality. Pricing theory, calibration and stochastic processes of interest rates Numerical methods; Binomial and trinomial trees, PDEs (Crank-Nicholson), Newton-Raphson in 2 dimension. Black models, Normal models and Market models Pricing before and after the credit crises and the multiple curve framework. Valuation with collateral agreements, CVA, DVA and FVA

Jan Roman is Financial Engineer in the Quantitative Risk Modelling Group at Swedbank Robur Funds, where he specializes in risk model validation, focusing on all inputs to front office systems including interest rates and volatility structures. He has over 16 years financial markets experience mostly in financial modeling and valuation in derivatives environments. He has held positions as Head of Market and Credit Risk, Swedbank Markets, Senior Risk Analyst at the Swedish financial Supervisory Authority, Senior Developer at SunGard and Senior Developer, OMX Stockholm Exchange. Jan is also Senior Lecturer, Malardalen University, Sweden, where he teaches Analytical finance and financial engineering. He holds a PhD in Theoretical Physics from Chalmers University of Technology.

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