FINANCE CONCEPTS

CIFT
total training solutions

Next Generation Models for Multi-Asset Derivatives

This advanced course is designed for traders, hedge-fund managers, risk managers and quantitative analysts

The objective of the course is to cover methods for calibration, pricing and hedging of complex derivative instruments with multiple underlyings, especially with applications to basket options on FX and Equity

by
Marco Avellaneda & Rama Cont

Topics

- Understanding correlation risk and its impact on basket options
- Calibration techniques for implied volatility surfaces in markets with multiple underlying assets
- Weighted Monte Carlo: a new approach for calibrating asset-pricing models
- New techniques for analysing the implied volatility skew of exchange traded and over-the-counter derivatives based on multiple assets
- Analysis and modelling of the impact of sudden market movements on multi-asset options
- Specific instruments: ETFs, options on indices and ETFs, cross-currency FX options, barrier FX options

NEW WORKSHOP SERIES

FINANCE CONCEPTS and CIFT have joined forces in providing you with the first of a series of leading edge practical workshops.

Dates:
26 & 27 Feb 2004
23 & 24 Sep 2004
Venue:
CIFT Training Centre
Price:
£1995 plus VAT

Derivatives have become increasingly complex and this advanced programme, which has been specifically designed for traders, hedge fund managers, risk managers and quantitative analysts, will cover the methods for calibration, pricing and hedging of complex derivatives. Specifically it will look at derivatives with multiple underlyings.

*The programme will be taught by world class experts, who combine **practical experience and are at the forefront of research**. The style is based on interactivity, workshops and intense discussions throughout the two days.*

AGENDA

Day One

Volatility Modelling

- Essentials of
  - implied volatility
  - realized volatility
  - instantaneous volatility
- Econometrics of volatility in
  - equity markets
  - FX markets

Pricing Multi-Asset Options

- Lognormal approximations
- Moment matching methods
- The Monte Carlo method
- The basket option smile

Correlation Risk

- "Correlation risk" and its impact on multi-asset options
- Correlation risk in Black Scholes models
- The difficulty of estimating correlation
- Historical and implied correlation

Impact of Jumps

- Crashes and other correlated jumps
- Basket options in the presence of jump risk
- Describing the correlation between processes with jumps

Day Two

Building Multi-Asset Diffusion Models

- Models consistent with market implied volatility skews
- Steepest-descent methods for calculating implied volatility skews for
  - index options and
  - cross-currency options based on the skews of the components/base currency pairs

Building Multi-Asset Jump-Diffusion Models

- Building multi-asset jump-diffusion models consistent with market implied volatility skews
- Calibrating a jump-diffusion model to the skew of a single asset
- Integrating views on correlation with individual skews

Weighted Monte Carlo

- Basic theory and its implementation in the case of multiple underlying instruments

Risk Management for Multi-Asset Derivatives

- Hedging and portfolio strategies with multiple underlying assets using Weighted Monte Carlo and Steepest-Descent methods

Course References and Papers contributed by Finance Concepts

- M. Avellaneda, D. Boyer-Olson, J. Busca, P. Friz: *Reconstructing Volatility, RISK, October 2002*
- M Avellaneda, R. Buff, C. Friedman, N. Grandchamp, L. Kruk, *Weighted Monte Carlo: A new approach for calibration of asset-pricing models, IJTAF, 2001*
- M. Avellaneda, *Minimum relative-entropy calibration of asset-pricing models, IJTAF, 1998*
- J. Lim, *Pricing and Hedging Index Options, NYU Ph D Thesis, 2003*
- R Cont, P Tankov (2002) *Calibration of jump diffusion option pricing models, Journal of Computational Finance, forthcoming*
- R Cont, P Tankov (2003) *Financial modelling with jump processes, CRC Press*

FINANCE CONCEPTS and CIFT In-house Training

CIFT, an established provider of financial training solutions has joined forces and established a partnership with **FINANCE CONCEPTS**, offering services in training, consulting and development in Risk Management and quantitative finance. Founded by Marco Avellaneda, Rama Cont, Nicole El Karoui and Bruno Dupire, **FINANCE CONCEPTS** is armed with a team of experts covering a wide range of topics related to the use and implementation of quantitative models in risk management. Through this joint venture CIFT and **FINANCE CONCEPTS** serve the finance community by offering a series of open enrolment training courses and also:

- Inhouse training
- Consultancy

focusing on the needs of: traders for equity and fixed income derivatives, quantitative analysts, risk management and hedge fund managers. All programmes designed for you are delivered globally and we will work with you to design the programme to meet your needs.

For further information about this or any of the training opportunities that CIFT has to offer, please contact ***Natalie George*** at our London office on +44 20 7613 5444.

FINANCE CONCEPTS PARTNERS

Marco Avellaneda

Marco AVELLANEDA has held positions as Professor of Applied Mathematics and Director of Division of Financial Mathematics at New York University, Courant Institute of Mathematical Sciences, as Vice President in the Derivative Products group at Morgan Stanley, and as a partner at the Gargoyle Equity Volatility Fund. Known in finance as the inventor of the Uncertain Volatility model and for his work on the Weighted Monte Carlo algorithm, he also has extensive advisory and consulting experience in the fields of volatility trading, relative-value trading, pricing and analysis, arbitrage and the OTC market. An established author in the areas of quantitative modelling of derivative securities and quantitative analysis on financial markets, Marco has also written approximately 90 research papers and is Managing Editor for “International Journal of Theoretical and Applied Finance”.

Rama Cont

Rama CONT is a CNRS Research Fellow at Centre de Mathématiques Appliquées, Ecole Polytechnique (France) and the director of Frontiers in Finance, an association of finance professionals aimed at the dissemination of quantitative techniques in risk management. His research interests include the development of option pricing models and algorithms, interest rate dynamics, models based on implied volatility and issues related to model selection and calibration. Rama has extensive experience in teaching in the finance arena at various academic institutions in Europe and the US, as well as training courses for finance professionals. He has also worked as a consultant for several financial institutions in France on topics ranging from performance analysis of hedge funds to numerical methods for model calibration.

Bruno Dupire

Bruno DUPIRE has headed the Derivatives Research teams at Sociètè Gènèrale, Paribas Capital Markets and Nikko Financial Products before being a consultant in derivatives and asset allocation and now joining Bloomberg to develop pricing, risk management and arbitrage models. He is best known for having pioneered the widely used local volatility model (simplest extension of the Black-Scholes-Merton model to fit all option prices) in 1993 and subsequent stochastic volatility extensions. Before these years, he obtained a Master’s Degree in Artificial Intelligence, a PhD in Numerical Analysis and introduced the use of Neural Networks for financial time series forecasting. In 2002 he was included in the Risk magazine “Hall of Fame” of the 50 most influential people in Derivatives and Risk Management.

Nicole el Karoui

Currently a Professor of Applied Mathematics at Ecole Polytechnique, Nicole is a well known expert in mathematical finance with numerous publications in this field and a recognized expertise in stochastic models in finance, term structure modelling, credit risk, pricing and hedging of derivative instruments and stochastic optimization theory.

Founder of one of the oldest graduate programs in quantitative finance, she has also accumulated more than 20 years of experience in consulting for various financial institutions and hedge funds in Europe.

Most recently her papers have covered optimal design of derivatives in illiquid markets and optimal portfolio management with American capital guarantees.

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☐ Ref number: NXG01, Dates: 26 & 27 Feb 2004	Venue: CIFT Training Centre	Price: £1995 plus VAT
☐ Ref number: NXG02, Dates: 23 & 24 Sep 2004	Venue: CIFT Training Centre	Price: £1995 plus VAT

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