Scenario Generation and Simulation for Risk Control – 1 day workshop

Objectives: Scope and Purpose

Scenario Generation typically is based on Monte Carlo techniques to generate data paths in various financial model set-ups and for different asset classes. In this workshop, Monte Carlo techniques are introduced and discretisation schemes are presented. We highlight the importance of carefully chosen random numbers for scenarios and explain generation of paths driven by a Brownian motion and scenario generation based on the Heston model. Furthermore, we present a taxonomy and structure of scenario generation methods. The description of asset price behaviour by discrete scenarios is considered and in particular, description of asset price dynamics using hidden Markov model is presented.

Learning Outcomes

After successful completion of the workshop, the participants will

- be able to:
  - understand concepts of Monte Carlo simulation and their use in scenario generation,
  - test the desirable properties of scenario generation,
  - apply Monte Carlo methods to generate scenarios in asset models,
  - understand basics of hidden Markov models in creating scenarios.

- have acquired a good knowledge of modern Monte Carlo methods as well as of Hidden Markov models to generate scenarios.

Workshop Duration: 1 day

Workshop Format:
The workshop is well balanced between Theory and Practical Sessions. Attendee numbers are limited to ensure that personalised interaction can take place.

Practical sessions:
In the practical sessions, the basic concepts of the software R are introduced. The delegates will implement a Monte Carlo framework to create asset price paths using the Heston model. In the area of filtering, existing R packages are introduced and briefly applied.

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Target Audience:
Practitioners at banks, risk professionals, traders, consultants and academics.

Presenter:
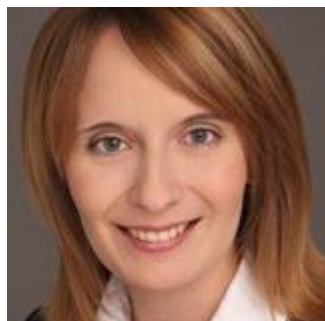
Dr Christina Erlwein-Sayer is a quantitative analyst and senior researcher working on the topic of financial analytics in general and models and tools for portfolio construction and credit risk assessment in particular. Dr Erlwein-Sayer completed her PhD in Mathematics at Brunel University, London in 2008. She then worked as a researcher and consultant in the Financial Mathematics Department at Fraunhofer ITWM, Kaiserslautern, Germany before she started her role at OptiRisk in 2015 under a joint project between OptiRisk Systems and its partner Fraunhofer ITWM. Prior to the current assignment Dr Erlwein-Sayer had presented workshops on behalf of OptiRisk at IIM Calcutta in Kolkata and Mumbai. She was also the lead member of the training partnership between OptiRisk Systems and Fraunhofer ITWM and presented at many of the workshops; notable among these was the training delivered to the World Bank in Washington. Dr Erlwein-Sayer is fluent in German (her native language) and in English.

Registration Fees: **£575 + VAT**

Delegates are also welcome to participate **online** at a 50% discounted rate to the prices listed above. This workshop will be streamed live online to delegates all around the world. Discounted rates for group bookings can be also arranged on request.

Provisional Timetable:

TIME	TOPIC
9:00	**Registration & Coffee**
9:30	**Monte Carlo and Random Numbers** • Theoretical background of Monte Carlo • Random Numbers and Scenario generation • Alternative approaches to scenario generation • Desirable properties of scenario generation • Application: Option pricing • Hands-on (I): Prototype: Bootstrapping & Heston
13:00	**Lunch**
	Risk Management and Hidden Markov models (HMM) • Introduction to risk measures • Application of HMM for asset returns • Application of HMM in scenario generation • Hands-on (II): Prototype: Bootstrapping, Heston and HMM
17:00	**End**

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