Lisbon Financial Mathematics 2018

5th Edition - Winter Meeting - February 19 -20
CEMAPRE – REM – ISEG

Mathematical Analysis and Computational Finance *Group*

***Location*: ISEG, Universidade de Lisboa (Building Quelhas-6, floor 4, Amphitheatre 1)**
***Organizers:* João Guerra, João Janela, Manuel Guerra and Maria do Rosário Grossinho**

Mini course (3 h + 1h discussion)

- **Daniel Sevcovic, *Comenius University, Slovakia***

Title: Numerical and analytical methods for pricing financial derivatives

Abstract. The lectures are focused on analytical and numerical methods for pricing financial derivatives like options on underlying stocks. Starting from the classical Black-Scholes equation for pricing vanilla options we focus on path dependent options including pricing of American style options, Asian and barrier style of options. The methodology how to price such financial instruments is based on solving partial differential equations. In some cases the underlying equation can be solved analytically. In the case of American style and path dependent options the solution is provided by means of numerical approximation scheme.

Mini course Outline

1 **Pricing financial derivatives**
Introduction to the theory of pricing financial derivatives. The role of protecting financial portfolios. Stochastic character of financial assets. Using derivative securities as a tool for protecting volatile stock portfolios. Black-Scholes partial differential equation for pricing plain vanilla and more complex options.

2 **Numerical methods for pricing of derivatives**
Explicit numerical finite difference method for solving the Black-Scholes equation. Discrete methods based on binomial and trinomial trees. Implicit numerical method for solving the
Black-Scholes equation. Compendium of numerical methods for solving systems of linear equations. Gauss-Seidel successive over-relaxation method. Methods for solving linear complementarity problems. Projected successive over-relaxation method. Numerical solutions of the obstacle problem. Numerical methods for pricing of American style options.

Lecture

- **Cláudia Nunes,** ***Universidade de Lisboa, Instituto Superior Técnico***
  Title: Hysteresis due to Irreversible Exit: Addressing the Option to Mothball

Talks

- **Carlos Oliveira,** ***Universidade de Lisboa, Instituto Superior Técnico***
  Title*:* Optimal investment decision under switching regimes of subsidy support

- **Gilson Silva,** ***Universidade de Lisboa, Instituto Superior de Economia e Gestão***
  Title: Jump-Telegraph Diffusion Model: An alternative for pricing option

- **José Cruz,** ***Universidade de Lisboa, Instituto Superior de Economia e Gestão***
  Title: TBA

INFO: **No registration fee. Certificate will be given to participants (signature on both days upon arrival)**

Lisbon Financial Mathematics 2018 - Schedule

Building Quelhas-6, floor 4,
Amphitheatre 4

Monday, 19

14.30 - 16.00	Daniel Sevcović
16.00 - 16.20	*Discussion Break*
16.20 - 17.00	Cláudia Nunes
17.00 - 17.20	Carlos Oliveira
17.20 – 17.40	Gilson Silva

Port wine

Tuesday, 20

14.00 - 15.30	Daniel Sevcović
15.30 - 16.00	*Discussion Break*
16.00 - 16.30	José Cruz