

Technikerstraße 13/7
A-6020 Innsbruck
Telefon: +43 512 507 6071 oder 6097

E-Mail: mathematik@uibk.ac.at
<http://www.uibk.ac.at/mathematik/>
Fax: +43 512 507 2920

MATHEMATIKKOLLOQUIUM

Das Institut für Mathematik lädt zu folgendem Vortrag ein:

Karel In't Hout

Department of Mathematics and Computer Science, University of Antwerp, Belgium

ADI schemes for multi-dimensional convection-diffusion problems in finance

This talk deals with numerical methods for solving time-dependent multi-dimensional PDEs arising in financial option pricing. For the numerical solution, we consider the well-known method-of-lines approach, whereby the PDE is first discretized in the spatial variables, yielding a large system of ordinary differential equations (ODEs), which is subsequently solved by applying a suitable numerical time-discretization method. In general, the obtained systems of ODEs are very large and stiff, and standard time-discretization methods are not effective.

Accordingly, tailored numerical time-stepping methods are required. In the past decades, operator splitting schemes of the Alternating Direction Implicit (ADI) type have proven to be a successful tool for efficiently dealing with many of such systems. However, PDEs modelling option prices often contain mixed-derivative terms, stemming from correlations between the underlying Brownian motions, and ADI schemes were not originally developed to deal with such terms.

In this talk we shall consider the popular Heston stochastic volatility model, which is a time-dependent two-dimensional convection-diffusion equation containing a mixed derivative term. After describing its semi-discretization by finite differences, we show how various ADI schemes can be adapted to the numerical solution of the obtained ODE systems. We next discuss several recent theoretical results on the stability of these schemes. Finally we present numerical experiments for realistic examples from the literature.

Zeit: Dienstag, den 31. März 2009 um 17:15 Uhr

Ort: Victor-Franz-Hess Haus, Technikerstraße 25, HS F

Gäste sind herzlich willkommen!

Alexander Ostermann