OPTIONS AND MATHEMATICS (CTH$[TMA155]$&GU$[MAM690]$)

http://www.math.chalmers.se/Math/Grundutb/CTH/tma155/
http://www.math.chalmers.se/Math/Grundutb/GU/MAM690/

Period 4, spring 2006

Lectures (40 hours) in room MVF31: Weeks 11-14, 17-20: Wednesday 10-12, Thursday 10-12 ; Weeks 12, 14, 18, 20: Tuesday 15-17

Teacher and examiner: Christer Borell, e-mail: borell@math.chalmers.se, phone: 772 35 53

Textbook: Christer Borell, Introduction to the Black-Scholes Theory (can be purchased at the DC, Maskingränd, Chalmers, from week 11)

CONTENTS

Probabilistic representations of solutions to the heat equation and some other parabolic differential equations.

Week 17

The Black-Scholes model and differential equation. Call and put prices. Simple currency derivatives.

Week 18

Options on futures contracts.The Greeks and sensitivity analysis. The Black-Scholes prices of path-dependent options. Implied volatility.

Week 19

Bivariate Brownian motion. The option to exchange one asset for another. The option on the maximum of two asset prices.

Week 20

Calls and puts written on dividend-paying underlying assets.

EXAMINATION

Written examination (4 hours):
   May 20, 2006, v
   September 2, 2006, v
   January 20, 2007, v
   Aid not permitted.

The test comprises 15 points; to pass requires at least 6 points (at GU 11 points or more is graded VG; at Chalmers a result greater than or equal to 9 points and smaller than 12 points is graded 4 and a result greater than or equal to 12 points is graded 5).

   Assignments

   A number of exercises solved and handed in by the student at the latest Thursday, April 27 at 10^{45} will result in a maximum of 1 point at the final examination.

The written examination thus comprises 15 points, where at least 6 points are of a theoretic nature. At least 3 points from the theoretic part are collected from the following list:

Theorem 1.1.2

Theorem 1.1.3

Theorem 1.1.4

Theorem 2.1.1

Theorem 2.2.1

Theorem 3.3.1

Theorem 4.1.1

Theorem 4.2.1

Theorem 4.3.1

Theorem 4.3.2

Theorem 5.1.1

Theorem 5.2.1

Theorem 5.3.1 (only the formula for delta)

Theorem 6.1.1

Example 6.1.1

Göteborg August 23, 2006

Christer Borell