

1st Year Course

Arbitrage Theory in Continuous Time [CTF(b)]

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Course Description:

The object of the course is to present the fundamentals of arbitrage theory for pricing contingent claims in continuous time.

Prerequisites:

The students are assumed to have taken the course "Continuous Time Finance (a)". More precisely the students are assumed to have basic knowledge of the following mathematical areas:

- Measure and integration theory, including the Radon Nikodym theorem
- Stochastic differential equations
- The Kolmogorov backward equation
- The Feynman-Kac representation Theorem
- The Ito formula
- The Girsanov Theorem
- The stochastic integral representation Theorem for Wiener martingales

The students are also assumed to be familiar with elementary theory for arbitrage free pricing and hedging of European derivatives within the Black-Scholes model.

Course Content:

1. Extensions of the Black.-Scholes model: Dividends, currency derivatives.
2. Incomplete markets: Pricing in a factor model, the market price of risk.
3. The martingale approach to arbitrage pricing. Martingale measures. The first and second fundamental theorems.
4. Interest rate theory: Short rate models, affine term structures, inversion of the yield curve, forward rate models, the HJM approach.
5. Change of numeraire: The normalized economy, pricing in a new numeraire, forward measures, the general option pricing formula, forward and futures contracts.
6. LIBOR and swaption market models.

Literature:

Tomas Björk: "Arbitrage Theory in Continuous Time", 2nd ed. Oxford University Press 2004

Lecture Notes:

[Lecture notes](#)

Time Schedule:

Mon,	Mar 05,	11.00-12.30 & 14.00-15.30; SZ VI
Tue,	Mar 06,	11.00-12.30 & 14.00-15.30; SZ VI
Wed,	Mar 07,	11.00-12.30 & 14.00-15.30; SZ VI
Thu,	Mar 08,	11.00-12.30 & 14.00-15.30; SZ VI
Mon,	Mar 12,	12:30-15.30 & 16.00-17.30; SZ VI (incl. break)
Tue,	Mar 13,	12:30-15.30 & 16.00-17.30; SZ VI (incl. break)
Wed,	Mar 14,	11.00-12.30 & 14.00-17.30; SZ VI (incl. break)
Thu,	Mar 15,	12.30-15.30; HS II (incl. break)

Location:

Institute for Advanced Studies, Vienna
1060, Stumpergasse 56

Examination:

Fri, Apr 27, 2007; 9.00-14.00, seminar room 2 at BWZ
1210, Brünnerstr. 72