

STOCHASTIC PROCESSES IN FINANCIAL MARKETS (ECTS 3)

GENERAL AND SPECIFIC GOALS OF THE COURSE

The course Stochastic processes in the financial markets provides a basis and a framework for quantitative understanding and description of stochastic processes that daily take place in the financial markets. During the course (a) an insight into the mechanisms leading to stochastic processes is given and quantities (such as stock prices or interest rates), variation of which is described by the stochastic processes, are identified; (b) a mathematical framework for the description, characterization and classification of the stochastic processes is defined; (c) mathematical tools for analytical and numerical description and/or simulation of stochastic processes are developed; (d) the most important models suitable for the description of the stochastic processes in the financial markets such as the variation of stock prices, the valuation of derivatives, dynamics of interest rates and exchange rates, etc. are elaborated; (e) a practical connection with empirical data for quantities in the financial markets that follow stochastic processes is demonstrated. Within the course, the theoretical concepts are illustrated by the analyses of several practical problems: the description of the variation of stock prices using the model of simple random walk; the valuation of the European option using the binomial tree; and the simulation of the stochastic process using the Euler discretization scheme.