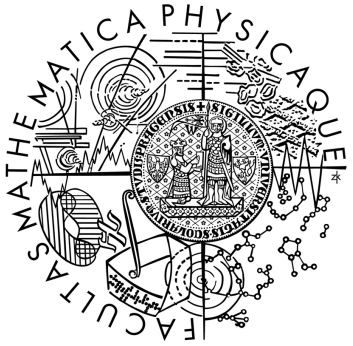
Univerzita Karlova v Praze

Matematicko-fyzikální fakulta

BAKALÁŘSKÁ PRÁCE



Filip Lacina

Stochastická integrace

Katedra pravděpodobnosti a matematické statistiky

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Title: Stochastic integration

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Abstract: The modern theory of probability, theory of stochastic processes and financial mathematics insist on the inctroduction of many important notions. This work deals with one of them. Namely the stochastic integral, it means integral of a random function (stochastic process) with respect to the Wiener process (Brownian motion), as a process with independent increments. The problem is, the Wiener process is not off a finite variation, thus we cannot construct stochastic integral as a Lebesgue-Stieltjes integral. To solve this situation we will use finite quadratic variation of Wiener process and Doob inequalities. The construction of stochastic integral itself uses the Lenglart inequality, unlike the construction introduced in J. Dupačová, J. Hurt and J. Štěpán: Stochastic Modeling in Economics and Finance, paragraph III.2. After that we will show that every continouous process is an appropriate integrand for our stochastic intergal. At the end of this work we will prove the one-dimensional Itô formula.

Keywords: martingale, Markov time, Wiener process, stochastic integral.