

Abstract: Traditional Monte Carlo methods for a calculation of risk quantities (mainly VaR and TVaR) use for modeling of individual risk factors very simplified models of stochastic differential equations, where the drift and diffusion functions contain usually only one or two parameters. Such approach naturally reduces the accuracy of the final result and may significantly underestimate the risk of the portfolio. In this paper we focus on the construction of a portfolio risk model that uses nonparametric statistics theory. We shall assume the development of risk factors (specifically interest rate curve) is described by stochastic differential equation, but set minimum requirements for the drift and diffusion functions and thus better reflect the information contained in historical observations.

Keywords: stochastic process, nonparametric estimation, diffusion, drift, local time, VaR, TVaR