

Exit problems and extremes of stochastic processes appear in a natural way in various theories as the theory of risk, the theory of queues or financial mathematics. The aim of this research project is to study these objects, both in one-dimensional and multi-dimensional setting. Under suitable assumptions (as e.g. Gaussian or Markovian structure) in result one obtains a random variable or a random vector, for which description of the distribution is a difficult task. In this project we will work out techniques which allow investigation of such the distributions.

One part of the project is dedicated to applied probability modelling. In particular, within this project we consider some problems important for stochastic networks, stochastic optimization problems in financial modelling and ruin probabilities.