Title: Joint Models for Longitudinal and Time-to-Event Data

Author: Jana Vorlíčková

Department: Department of Probability and Mathematical Statistics

Supervisor: doc. RNDr. Arnošt Komárek, Ph.D., Department of Probability and Mathematical Statistics

Abstract: The joint model of longitudinal data and time-to-event data creates a framework to analyze longitudinal and survival outcomes simultaneously. A commonly used approach is an interconnection of the linear mixed effects model and the Cox model through a latent variable. Two special examples of this model are presented, namely, a joint model with shared random effects and a joint latent class model. In the thesis we focus on the joint latent class model. This model assumes an existence of latent classes in the population that we are not able to observe. Consequently, it is assumed that the longitudinal part and the survival part of the model are independent within one class. The main intention of this work is to transfer the model to the Bayesian framework and to discuss an estimation procedure of parameters using a Bayesian statistic. It consists of a definition of the model in the Bayesian framework, a discussion of prior distributions and the derivation of the full conditional distributions for all parameters of the model. The model's ability to estimate the composition of the population with respect to latent classes and estimate the parameters of the model is evaluated in a simulation study.