

Often the motivation behind building a statistical model is to provide prediction for an outcome of interest. In the context of survival analysis it is important to distinguish between two types of time-varying covariates and take into careful consideration the appropriate type of analysis. Joint model for longitudinal and time-to-event data, in contrast to standard Cox model, enables to account for continuous change of the covariate over time in the survival model. In this thesis two examples of joint models are presented, the shared random-effect model and the joint latent class model. Bayesian estimation of the model parameters and summary of methodology for dynamic prediction of individual survival probability is provided for the first one of the aforementioned types of models. Application of the theoretical knowledge is illustrated in the analysis of the data on primary biliary cirrhosis. The impact of number of patients, number of longitudinal measurements and per-cent of censoring on the quality of prediction and estimates of the model parameters is examined in the simulation study.