Talk 22: Irène Votsi (Université de Lorraine)

Title: Statistical estimation of risk indicators for semi-Markov models

Abstract. This presentation consists of three main parts. First, we focus on semi-Markov chains and present explicit formulas to describe risk indicators such as failure rates. The Markov chains are defined in a discrete state space and the indicators are estimated by means of empirical plug-in type estimators. In a large sample context, these estimators are shown to be strongly consistent and asymptotically normal. The results are applied in the field of wind energy production. In the case of multiple trajectories, new expressions are derived along with the corresponding estimators. Second, we move to continuous-time semi-Markov processes and present bootstrapped, kernel-type estimators and bootstrapped kernel-type estimators. These last estimators are very advantageous in the case of real data studies, since the evaluation of their asymptotic confidence intervals is feasible due to the fact that they do not depend on theoretical quantities. In the third part semi-Markov chains are considered to be partially observed. Explicit formulas are derived and estimated by means of plug-in type estimators.