

Title: Cluster point processes in insurance mathematics

Author: Veronika Veselá

Department: Department of Probability and Mathematical Statistics

Supervisor: RNDr. Zbyněk Pawlas, Ph.D.

Abstract: In the present work we study point processes and their importance in insurance mathematics. With the help of cluster and marked point processes we can describe a model that considers times of claim occurrence and times and heights of corresponding payments. We study two specific models which can be used to predict how much money is needed for claims which happened. The first model is chain ladder in the form of Mack's model. For this model we show chain ladder estimators of development factors, estimates of their variance and their properties. We try to find one-step ahead prediction and multi-step ahead prediction, which we use for calculating prediction of reserves. We shortly review asymptotic properties of the estimators in Mack's model. The second model is the Poisson cluster model. Firstly we define this model and the variables entering the model. Then we devote attention to one-step ahead and multi-step ahead prediction. We also study prediction when some variables have specific distributions. Finally, we use both methods of prediction on simulated data and compare their average relative absolute errors.

Keywords: point process, cluster point process, Mack's model, Poisson cluster model.