Abstract

After the 2008 financial crisis, new regulations around the world have been proposed to regulate the insurance industry. Regulations such as Solvency II and Risk Based Capital II are some of the new proposals to safeguard policy holders and shareholders. The quantitative requirements of these regulations allow insurers the flexibility to compute their capital requirements using an internal model. Hence, to ensure that they do not reserves too much or too little capital, insurers focus on building a dynamic internal model. This thesis aims to contribute a part of the internal model by focusing on insurance risk for non-life insurance products. By introducing the Cramer Lundberg model and Sparre Andersen model from collective risk theory, and employing the stochastic principles for claims arrival, a dynamic internal model could be built.

In this thesis, I study the construction of this internal model using a dataset consisting of Danish Fire Insurance claims. I analyse and model claims arrival by studying the homogenous Poisson process, inhomogeneous Poisson process and renewal process. In addition, I showed that fitting a single parametric distribution over the claims losses is unsuitable, and propose to study the claims losses by a mixture distribution. This mixture distribution consist of two parts, the non-extreme claims losses and the extreme claims losses. For the non-extreme claims losses, a medium tailed distribution that is truncated appropriately at its upper end point is used. For the extreme claims losses, I used the method of Peak Over Threshold from the extreme value theory and model the extreme events using a generalised Pareto distribution. All analysis is conducted using R software. I coded a customised Kolmogorov-Smirnov test to assess the goodness of fit of double truncated distributions.