INSURANCE RISK CLASSIFICATION WITH NEGATIVE BINOMIAL DISTRIBUTION

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Risk classification is the process of statistical modeling that classifies risks into cross-classified classes, characterized by the rating factors. In this paper, risk classification is applied to estimate claim frequency rates, expressed in terms of claim count per exposure unit. The Poisson regression model has been widely used to analyze claim frequency rates in the recent years. However, under the Poisson model, the mean and variance is assumed to be equal within classes, i.e., homogeneous rates. In this paper, the Negative Binomial regression model is suggested to deal with heterogeneous rates. In addition, the measures for goodness-of-fit of the model, namely the Pearson chi-square, deviance, and likelihood ratio test, are also discussed. Finally, the procedure for estimation of parameters, namely the Iteratively Weighted Least Squares (IWLS), is also shown. In this paper, the models are fitted and tested on two types of claim data; Canadian private automobile liability insurance and Malaysian private automobile own damage insurance.

Keywords:Risk classification; Heterogeneous; Negative Binomial.