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## **CLAIMS RESERVING WITH HGLM**

### **Abstract:**

We consider the problem of estimating IBNR (Incurred But Not Reported) loss reserves in non-life insurance. The literature proposes a wide variety of methods to estimate IBNR reserves, mostly based on the chain-ladder approach (Mack, 1993). In this paper we focus on two methods, in which unobservable risk parameters  $U=(U_1, \dots, U_k)'$  are taken into account. Firstly, we propose HGLM model based in GLM loss reserving (Wüthrich and Mertz, 2008), where conditional incremental payments (response variables) taken from loss triangle follow the distribution of an exponential dispersion family. Secondly, we modify the CapeCode method which uses the growth curve modelling (Clark, 2003). This method is based on two-stage estimation of the expected amount of loss to emerge: the estimation of the ultimate loss by year and the estimation of the pattern of loss emergence. As the pattern of loss to emerge, log-logistic and Weibull growth curves are assumed. We imply another form of the growth curve and we add random effect yield the hierarchical model like in (Guszczka, 2008). Treating the ultimate losses in accident years as repeated measurements allows us to model parameters that determine the pattern of loss emergence in separately sub-models.

### **Keywords:**

loss reserving, random effect, HGLM, growth curve, R

**JEL Classification:** C13, C21, C49