Mathematical and Statistical Models

Compound Model for Two Dependent Kinds of Claim, by Christian Partrat (Université Claude Bernard, Villeurbanne Cedex, France)

In this paper we deal with the aggregate amount of claims for a compound class of policies submitted to claims of two kinds whose yearly frequencies are a priori dependent.

This dependence is modelled by some bivariate discrete distributions: Poisson and mixed Poisson (notably Poisson-Gamma and Poisson-Inverse Gaussian). These distributions are checked with some recent data concerning natural events insurance in the United States and third-party liability automobile insurance in France. *Insurance: Mathematics & Economics*, December 1994, 15(2/3): 219-231. (Reprinted with permission of North-Holland Publishing Company.)

A Family of Discrete Distributions, by R. S. Ambagaspitiya (University of Calgary)

Ambagaspitiya and Balakrishnan (1994a) used the identity

$$P_n = \frac{a}{a+b}\left(b+\frac{a}{n}\right)P_{n-1}(a+b,b), n=1,2...,$$

with $p_0(a,b) = \exp(-a)$ to obtain a recursive formula for computing the distribution function of the compound generalized Poisson distribution. In this paper, we consider the discrete distribution family with the property

$$P_n(a,b) = \left(h_1(a,b)+\frac{h_2(a,b)}{n}\right)P_{n-1}(a+b,b), n=1,2,...,$$

which is a generalization of the first identity. We prove that weighted generalized Poisson distributions and weighted generalized negative binomial distributions with weights of the form w(a + bn; b) are two subclasses in the family. We provide a recursive formula for computation of respective compound distributions. Also we discuss the stability of the recursion as well as handling overflow/underflow problems. *Insurance: Mathematics and Economics,* May 1995, 16(2): 107-127. (Reprinted with permission of North-Holland Publishing Company.)

Some Alternatives for the Individual Model, by R. Kaas (University of Amsterdam) and H. U. Gerber (Ecole des HEC, Lausanne, Switzerland)

Three approximations for the total claims of a risk portfolio (individual model) are compared: the traditional collective (compound Poisson) model, a compound binomial model, and a compound pseudo-binomial model (nearly homogeneous portfolio.) Of these, only the collective model is a prudent choice in terms of stop-loss order. The binomial model has a larger variance, but the nearly homogeneous approximation might have a lower one. The binomial model also leads to an exponentially larger distribution. *Insurance: Math-*