Recursive moments of the aggregate discounted claims with Erlang inter-occurrence distribution and dependence introduced by a FGM Copula

Franck Adekambi
University of Johannesburg, South Africa.

In this paper, we investigate the computation of the moments of the discounted compound renewal aggregate sums when introducing dependence between the inter-occurrence time and the subsequent claim size. We first assume that the inter-occurrence time is following an Erlang distribution and later extend our result to a mixture of Erlangs distribution. The dependence structure between the interoccurrence time and the subsequent claim size is defined by a Farlie-Gumbel-Morgenstern copula. Assuming that the claim distribution has finite moments, we obtain a general formula for any mth order moment. The results are illustrated with applications to premium calculation, moment matching methods, as well as inflation stress scenarios in Solvency II.

Keywords: Compound renewal process; discounted aggregate claims; Moments; FGM copula; Mix Erlang distribution.