

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

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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  $m$ th 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.