

On finite-time ruin probabilities with dependence between reinsurance cycles and the claim arrival process

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Abstract

Market cycles play a great role in reinsurance. Cycle transitions are not independent from the claim arrival process : a large claim or a high number of claims may accelerate cycle transitions. To take this into account, a semi-Markovian risk model is proposed and analyzed. A refined Erlangization method is developed to compute the finite-time ruin probability of a reinsurance company. As this model needs the claim amounts to be Phase-type distributed, known algorithms to fit mixtures of exponentials and mixtures of Erlangs to long-tailed distributions can be used. Numerical applications expose results provided by our model with the two fitting algorithms and compare them to classical approximations for the finite time ruin probability.

Key words: Finite-time ruin probability, reinsurance cycles, Erlangization, dependence in risk theory.
