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Explicit Expressions for the Ruin Probabilities of Erlang Risk Processes with Pareto Individual Claim Distributions

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摘要 In this paper we first consider a risk process in which claim inter-arrival times and the time until the first claim have an Erlang (2) distribution. An explicit solution is derived for the probability of ultimate ruin, given an initial reserve of u when the claim size follows a Pareto distribution. Follow Ramsay$^{[8]}$, Laplace transforms and exponential integrals are used to derive the solution, which involves a single integral of real valued functions along the positive real line, and the integrand is not of an oscillating kind. Then we show that the ultimate ruin probability can be expressed as the sum of expected values of functions of two different Gamma random variables. Finally, the results are extended to the Erlang(n) case. Numerical examples are given to illustrate the main results.

关键词 Ruin probability, Erlang process, Pareto distribution, Laplace transform, removable singularity, contour integration

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Abstract

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