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On the distribution of the surplus prior to ruin. (English) Zbl 0770.62090

Insur. Math. Econ. 11, No. 3, 191-207 (1992).

Consider the classical risk model $Z_t = u + ct - X_t$, where u is the initial surplus, c is the premium rate with a positive loading and X_t are aggregate claims up to time t . It is supposed that X_t satisfies the standard assumption of a compound Poisson process with constant intensity λ . Let $\psi(u)$ denote the probability of ultimate ruin starting with the initial capital u and let T denote the time of ruin. Then $\psi(u) = P(T < \infty | Z_0 = u)$. The quantity $G(u, y) = P(T < \infty, Z_T > -y | Z_0 = u)$ denotes the probability that ruin occurs from initial surplus u and that the deficit at the time of ruin is less than y . Let $Z_{\tilde{T}}$ denote the surplus immediately prior to ruin (given that ruin occurs) and $F(u, x) = P(T < \infty, Z_{\tilde{T}} < x | Z_0 = u)$. The results derive $F(u, x)$ as a function of $\psi(u)$ and $G(u, y)$.

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MSC:

62P05 Applications of statistics to actuarial sciences and financial mathematics

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Keywords:

aggregate claim amount; severity of ruin; surplus prior to ruin; recursive calculation; classical risk model; initial surplus; premium rate; compound Poisson process; constant intensity; probability of ultimate ruin

Full Text: [DOI](#)

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