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Probability of ruin with variable premium rate in a Markovian environment. (English)

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Insur. Math. Econ. 29, No. 2, 291-296 (2001).

A risk reserve model has been discussed in which the claim number process $\{N(t) : t \geq 0\}$ is a Cox process with an intensity process $\{\lambda(t) : t > 0\}$ modeled as a homogeneous n-state Markov process. The successive claims $X_1, X_2, \ldots$ are assumed to be i.i.d. and independent of the claim number process. The premiums are received at a differentiable rate $c(r)$ depending on the current reserve $R(t) = r$, where $R(t)$ is the risk reserve at time t, i.e.

$$R(t) = R(0) + \int_0^t c(R(s))ds - \sum_{i=1}^{N(t)} x_i, \quad t \geq 0.$$

The author's main result provides an integral equation for the conditional probability of ruin given $\lambda(0) = \lambda_i$ and $R(0) = u$, from which the total probability of ruin $\Psi(u)$ is immediate.

For a special premium plan, taking a fixed interest investment of the reserve into account, the Laplace transforms of the corresponding ruin probabilities can be determined via a system of differential equations. More explicit forms of the latter are given in case of exponential claims and a two-state intensity process.

Reviewer: Josef Steinebach (Marburg)

MSC:

91B30	Risk theory, insurance (MSC2010)	Cited in **1** Review
60J27	Continuous-time Markov processes on discrete state spaces	Cited in **13** Documents
60K15	Markov renewal processes, semi-Markov processes	

Keywords:

ruin probability; risk reserve model; claim number process; Cox process; integral equation; Laplace transforms; exponential claims; two-state intensity process

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