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Gerber-Shiu analysis with two-sided acceptable levels. (English) Zbl 1364.91071
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Summary: In this paper, insurer's surplus process moved within upper and lower levels is analyzed. To this end, a truncated type of Gerber-Shiu function is proposed by further incorporating the minimum and the maximum surplus before ruin into the existing ones (e.g. [*H. U. Gerber* and *E. S. W. Shiu*, *N. Am. Actuar. J.* 2, No. 1, 48–78 (1998; [Zbl 1081.60550](#)); *E. C. K. Cheung* et al., *Insur. Math. Econ.* 46, No. 1, 117–126 (2010; [Zbl 1231.91157](#))]). A key component in our analysis of this proposed Gerber-Shiu function is the so-called transition kernel. Explicit expressions of the transition function under two different risk models are obtained. These two models are both generalizations of the classical Poisson risk model: (i) the first model provides flexibility in the net premium rate which is dependent on the surplus (such as linear or step function); and (ii) the second model assumes that claims arrive according to a Markovian arrival process (MAP). Finally, we discuss some applications of the truncated Gerber-Shiu function with numerical examples under various scenarios.

MSC:

- 91B30 Risk theory, insurance (MSC2010)
- 60K10 Applications of renewal theory (reliability, demand theory, etc.)
- 60K20 Applications of Markov renewal processes (reliability, queueing networks, etc.)

Keywords:

truncated Gerber-Shiu function; classical Poisson risk model; surplus-dependent premium rate; transition kernel; joint distribution of maximum and minimum before ruin; Markovian arrival process

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