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**The classical risk model with a constant dividend barrier: analysis of the Gerber-Shiu discounted penalty function.** (English) Zbl 1103.91369

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**Summary:** The classical compound Poisson risk model is considered in the presence of a constant dividend barrier. An integro-differential equation for the Gerber-Shiu discounted penalty function is derived and solved. The solution is a linear combination of the Gerber-Shiu function with no barrier and the solution of the associated homogeneous integro-differential equation. This latter function is proportional to the product of an exponential function and a compound geometric distribution function. The results are then used to find the Laplace transform of the time to ruin, the distribution of the surplus before ruin, and moments of the deficit at ruin. The special cases where the claim size distribution is exponential and a mixture of two exponentials are considered in some detail. The integro-differential equation is then extended to the stationary renewal risk model.

**MSC:**

91B30 Risk theory, insurance (MSC2010)

34K60 Qualitative investigation and simulation of models involving functional-differential equations

60G55 Point processes (e.g., Poisson, Cox, Hawkes processes)

Cited in **1** Review  
Cited in **105** Documents

**Keywords:**

ruin; integro-differential equation; Lundberg equation; renewal equation; compound geometric; time of ruin; surplus before ruin; deficit at ruin; exponential distribution; mixture of exponentials; stationary renewal risk process; Sparre Andersen process

**Full Text:** [DOI](#)

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