

**An algebraic operator approach
to the analysis of Gerber-Shiu functions**

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Abstract

We introduce an algebraic operator framework to study discounted penalty functions in renewal risk models. For inter-arrival and claim size distributions with rational Laplace transform, the usual integral equation is transformed into a boundary value problem, which is solved by symbolic techniques. The factorization of the differential operator can be lifted to the level of boundary value problems, amounting to iteratively solving first-order problems. This leads to an explicit expression for the Gerber-Shiu function in terms of the penalty function.

This is joint work with H. Albrecher (University of Lausanne), G. Pirsic (University of Linz), G. Regensburger (RICAM) and M. Rosenkranz (RICAM).