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Optimal Dividend Payments for the Piecewise-Deterministic Poisson Risk Model

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This paper deals with optimal dividend payment problem in the general setup of a piecewise-deterministic compound Poisson risk model. The objective of an insurance business under consideration is to maximize the expected discounted dividend payout up to the time of ruin. Both restricted and unrestricted payment schemes are considered. In the case of restricted payment scheme, the value function is shown to be a classical solution of the corresponding Hamilton-Jacobi-Bellman equation, which, in turn, leads to an optimal restricted dividend payment policy. When the claims are exponentially distributed, the value function and an optimal dividend payment policy of the threshold type are determined in closed forms under certain conditions. The case of unrestricted payment scheme gives rise to a singular stochastic control problem. By solving the associated integro-differential quasi-variational inequality, the value function and an optimal barrier strategy are determined explicitly in exponential claim size distributions. Two examples are demonstrated and compared to illustrate the main results.

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