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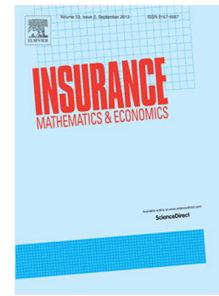
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Optimal dividends under Erlang(2) inter-dividend decision times

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Abstract

In the classical dividends problem, dividend decisions are allowed to be made at any time. Under such a framework, the optimal dividend strategies are often of barrier or threshold type, which can lead to very irregular dividend payments over time. In practice however companies distribute dividends on a periodic basis. In that spirit, “Erlangisation” techniques have been used to approximate problems with fixed inter-dividend decision times.

When studying the *optimality* of such strategies, the existing literature focuses exclusively on the special case of exponential— that is, Erlang(1)—inter-dividend decision times. Higher dimensional models are surprisingly difficult to study due to the implicit nature of some of the equations. While some of this difficulty continues to exist in high dimensions, in this paper we provide a stepping stone to the general Erlang(n) problem by providing a detailed analysis of the optimality of periodic barrier strategies when inter-dividend-decision times are Erlang(2) distributed. Results are illustrated.

Keywords: Brownian motion, Stochastic control, Dividends, Periodic strategies, Barrier strategies, Erlangisation

JEL codes: C44, C61, G24, G32, G35

1. Introduction

In actuarial risk theory, stochastic processes are used to model the surplus of a company. In the early 20th century, the probability of ruin—the probability that the surplus becomes negative—is used to assess the stability of a company (see, for example, Bühlmann, 1970; Asmussen and Albrecher, 2010). Due to the inverse relationship between probability of ruin and surplus, one should accumulate surplus to infinity in order to minimise the probability ruin. In response to this unrealistic feature, Bruno de Finetti (1957) proposed an alternative formulation of the stability criterion by allowing surplus to be released. Many papers have adopted this criterion and studied it; see Albrecher and Thonhauser (2009) and Avanzi (2009) for reviews.

Often, optimal decisions on when and how much dividends should be paid (i.e. an optimal dividend strategy) are determined by maximising the expected present value of dividends. However Gerber (1974) argued that this pure maximisation may lead to optimal strategies that are usually not realistic. In many surplus models, optimal dividend strategies are of barrier or threshold types. Such strategies typically have too irregular dividend payments, which is arguably unrealistic. Some studies have tried to address Gerber (1974)’s criticism by incorporating real practices adopted by companies (see Avanzi, Tu, and Wong, 2016, for a discussion of this). Motivated by the fact that companies tend to pay dividends at regular and

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