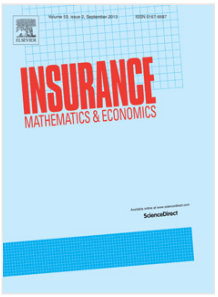

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Camilo Hernández, Mauricio Junca

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Optimal dividend payments under a time of ruin constraint: Exponential claims

Camilo Hernández[a], Mauricio Junca[a,1,*]

[a]*Department of Mathematics, Universidad de los Andes, Bogotá, Colombia*

Abstract

We consider the optimal dividends problem under the Cramér-Lundberg model with exponential claim sizes subject to a constraint on the expected time of ruin. We introduce the dual problem and show that the complementary slackness conditions are satisfied, thus there is no duality gap. Therefore the optimal value function can be obtained as the point-wise infimum of auxiliary value functions indexed by Lagrange multipliers. We also present a series of numerical examples.

Keywords: Dividend payments, Optimal control, Expected time of ruin constraint

1. Introduction

One of the most studied models in actuarial science to describe the reserves process of an insurance company is the Cramér-Lundberg model. In this model the company faces claims whose arrivals follow a compound Poisson process and a constant premium is paid by the insured clients.

After the model was introduced, the probability of ruin of such a portfolio was among the principal interests in this field, see [1]. Nowadays, results about minimizing the ruin probability considering reinsurance and investment in risky assets are proved by [8]. In [9], similar results for a discrete time version of the model and a diffusion approximation are shown. However, a process that does not end in ruin in a model exceeds every finite level, this is, the company lives an infinite period of time and accumulates an infinite amount of money, which is quite unrealistic in practice.

*Corresponding author
Email addresses: mc.hernandez131@uniandes.edu.co (Camilo Hernández), mj.junca20@uniandes.edu.co (Mauricio Junca)

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