ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

INVITATION TO THE DOCTORAL SEMINAR

Decision making in PDMP risk models

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ABSTRACT

Piecewise deterministic Markov processes (PDMPs) provide a natural framework for modeling risk processes in insurance, combining deterministic dynamics with random jump events such as claims. In this talk, we study two decision-making problems in PDMP-type risk models. First, we consider a stochastic differential game between two insurance portfolios, where each player controls their surplus process via reinsurance. Considering a functional of the difference between these processes, one player aims to maximize this quantity and the other aims to minimize it, leading to a zero-sum game. Accordingly, each player seeks to determine their optimal strategy, depending on the actions of the other. This leads to upper and lower value functions, which can be characterized as viscosity solutions to Bellman-Isaacs equations. Second, we consider an optimal reporting problem in a bonus-malus setting. We assume that a policyholder wants to maximize their wealth at the time the contract terminates. If a claim occurs, it might be better not to report it, as the transition to a higher premium class might outweigh the claim payments. The goal is to find an optimal barrier strategy, which gives a threshold above which a claim should be reported. The problem can be linked to a system of Hamilton-Jacobi-Bellman equations. In

both problems, we solve the corresponding differential equations numerically, to obtain approximations of the optimal strategies.

We hope to see you there!

