



Einladung zum Oberseminar

am Mittwoch, den **14. Dezember 2022**, um 17:45 Uhr und 18:30 Uhr im Seminarraum 1 des Mathematischen Instituts (Raum 005), Weyertal 86–90, 50931 Köln. Es sprechen:

Prof. Dr. Zbigniew Palmowski (Wrocław University of Science and Technology, Polen) um 17:45 Uhr und

Dr. Lewis Ramsden (University of York, Großbritannien) um 18:30 Uhr.

Zbigniew Palmowski: Implicit control for Lévy-type dividend-impulse problem

Assume the capital or surplus of an insurance company evolves randomly over time as the spectrally negative Lévy process but where in addition the company has the possibility to pay out dividends to shareholders and to inject capital at a cost from shareholders. We impose that when the resulting surplus becomes negative the company has to decide whether to inject capital to get to a positive surplus level in order for the company to survive or to let ruin occur. The objective is to find the combined dividends and capital injections strategy that maximises the expected paid out dividends minus cost of injected capital, discounted at a constant rate, until ruin. We consider the setting where the cost of capital is level-dependent in the sense that it is higher when the surplus is below 0 than when it is above 0. We investigate optimality of a 3-parameter strategy with parameters $-r < 0 < c < b$ where dividends are paid out to keep the surplus below b , capital injections are made in order to keep the surplus above c unless capital drops below the level $-r$ in which case the company decides to let ruin occur. The proof is based on some monotonicity properties for the solution of the renewal equations with log-convex kernel.

Lewis Ramsden: Exit Times for a Markov-Modulated Random Walk with Applications in Risk Theory

In this talk, we will discuss exit problems for general upward skip-free Markov additive chains (MACs) or Markov-modulated random walks. In particular, we will construct and characterise a number of fundamental matrices related to the process, namely G and the so-called W and Z scale matrices, demonstrating how these quantities can be used to derive exit problems, as well as other fluctuation identities, including those related to the corresponding 'reflected process'. The theory developed in this discrete setup is chosen to echo those of the theory for continuous-time Markov additive processes (MAPs), further emphasising the utility of the scale functions/matrices, which allow us to identify the probabilistic construction, generating function and simple recursion relation for these matrices, as well as their connection to the so-called occupation mass functions.

In the second part of the talk, we will use this general fluctuation theory developed for (MACs) to develop the Gerber-Shiu theory for the classic and dual discrete risk processes in a regime-switching environment. In particular, by expressing the Gerber-Shiu function in terms of potential measures of an upward (downward) skip-free MAC, we derive closed form expressions for the Gerber-Shiu function in terms of the aforementioned scale matrices. Finally, we also present results for the value function of the associated constant dividend barrier problems for both risk processes.

Alle Interessenten sind herzlich eingeladen.

Die Dozenten der Stochastik