Optimal control of risk processes in insurance

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Abstract

In this series of two lectures we go over a number of stochastic optimal control problems in insurance driven by compound Poisson risk processes. The type of problems of interest are those where the risk process, which models the economic capital of an insurance company, can be controlled in some way with the goal of maximising or minimising a particular objective function. Examples are to find the optimal way to pay out dividends and inject capital to maximise shareholder value or to find the optimal underwriting policy that minimises the probability of ruin. The focus will be on examining when a particularly simple strategy is optimal in the case where the risk processes are driven by compound Poisson processes with one-sided jumps. Some of the tools that are needed to tackle such problems are fluctuation theory for compound Poisson risk processes, martingale techniques and monotonicity properties of solutions to renewal equations.