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Title: Minimizing insurer's ruin probability via periodic capital injections

Abstract:

Recently, Nie et al. (2011) has proposed an insurance risk model in which capital is immediately injected to restore the insurer's surplus level to a positive critical level b when the surplus falls between 0 and b , and the insurer is declared ruin once it falls below 0. One may interpret that the capital injections are made by the shareholders of the insurance company or by a reinsurer upon purchase of a perpetual reinsurance contract (and we primarily focus on the latter interpretation). Inspired by the idea of randomized observations in Albrecher et al. (2011), we further generalize Nie et al. (2011)'s model by assuming that capital injections are only allowed at a sequence of time points whose intervals are Erlang distributed (which can be used to approximate deterministic intervals, see Asmussen et al. (2002)). Quantities of interest include the Gerber-Shiu expected discounted penalty function (proposed by Gerber and Shiu (1998) and includes ruin probability as a special case) and the expected total discounted cost of capital injections before ruin. Numerical examples are provided, including the pricing of perpetual reinsurance contract (given the critical level b) as well as the resulting reduction of ruin probability. Consequently, we shall demonstrate how to select an optimal reinsurance contract to minimize the ruin probability. This is joint work with Hailiang Yang and Zhimin Zhang.