On the Erlang(n) dual risk model and dividends problems

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We consider the dual risk model, where premiums are regarded as costs and claims are viewed as profits. The surplus can be interpreted as a venture capital like the capital of an economic activity involved in research and development. We introduce an upper dividend barrier so that we model the gains of the venture capital and its return to the capital holders.

Most of existing results on the subject assume that the waiting times between the profits arrivals follow an exponential distribution. We generalize to the case when such times are Erlang(n) distributed, obtaining integrodifferential equations for the probability of getting a dividend and its complementary probability of ruin, the moments of discounted dividends and Laplace transforms for the time of getting a dividend.

Finally, for some particular profit distributions we show examples and obtain numerical results.

Keywords: Dual risk model; Erlang(n) interclaim times; generalized Lundberg’s equation; dividends probabilities; time of dividends; moments of discounted dividends.