On the evaluation of 'saving-consuming' plans

Steven Vanduffel Jan Dhaene Marc Goovaerts

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Abstract

Knowledge of the distribution function of the stochastically compounded (or present) value of a series of future (positive and/or negative) payments is needed for solving several problems in an insurance or finance environment, see e.g. Dhaene et al. (2002a, b). In Kaas et al. (2000), convex lower bound approximations for such a sum have been proposed. In case of changing signs of the payments however, the distribution function or the quantiles of the lower bound are not easy to determine, as the approximation for the random compounded value of the payments will in general not be a comonotonic sum.

In this paper, we present a method for determining accurate and easy computable approximations for risk measures of such a sum, in case one first has positive payments (savings) followed by negative ones (consumptions).

This particular cashflow pattern is observed in 'saving - consuming' plans. In such a plan, a person saves money on a regular basis for a certain number of years. The amount available at the end of this perion is then used to generate a yearly pension for a fixed number of years. Using the results of this paper one can easily find accurate answers to questions such as: "What is the minimal required yearly savings effort α during a fixed number of years, such that one will be able to meet, with a probability of at least $(1-\varepsilon)$, a given consumption pattern during the withdrawal period ?"