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Marginal indemnification function formulation for optimal reinsurance. (English)

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Summary: In this paper, we propose to combine the Marginal Indemnification Function (MIF) formulation and the Lagrangian dual method to solve optimal reinsurance model with distortion risk measure and distortion reinsurance premium principle. The MIF method exploits the absolute continuity of admissible indemnification functions and formulates optimal reinsurance model into a functional linear programming of determining an optimal measurable function valued over a bounded interval. The MIF method was recently introduced to analyze the reinsurance model but without premium budget constraint. In this paper, a Lagrangian dual method is applied to combine with MIF to solve for optimal reinsurance solutions under premium budget constraint. Compared with the existing literature, the proposed integrated MIF-based Lagrangian dual method provides a more technically convenient and transparent solution to the optimal reinsurance design. To demonstrate the practicality of the proposed method, analytical solution is derived on a particular reinsurance model that involves minimizing Conditional Value at Risk (a special case of distortion function) and with the reinsurance premium being determined by the inverse-S shaped distortion principle.

MSC:

91B30 Risk theory, insurance (MSC2010)

91B16 Utility theory

62P05 Applications of statistics to actuarial sciences and financial mathematics

Cited in **29** Documents

Keywords:

optimal reinsurance; marginal indemnification function; Lagrangian dual method; distortion risk measure; inverse-S shaped distortion premium principle

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