Application of an importance sampling method to risk models in insurance theory

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ABSTRACT: We apply an importance sampling simulation technique to risk models in insurance theory by giving attention to some analogous features between the insurance theory and the reliability analysis. First, expressing the risk as probability of ruin, we formulate it based upon the so-called Cramér-Lundberg model. Next, by the use of the Girsanov-Meyer theorem, we construct an importance sampling simulation scheme through a transformation of the probability measure. Finally, we give some numerical examples to show the efficiency of the proposed simulation scheme, which tells us that the proposed scheme works quite well for estimating extremely small probability of ruin. Further, a simple discussion is made on an application to a maintenance-scheduling problem.