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Using the Total Claim Amount Distribution to Compute Automobile Insurance Premiums in the Bonus Malus Systems

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Abstract

In the actuarial literature, most of the bonus malus systems compute the automobile insurance premiums taking into account only the variable number of claims without considering their corresponding amount. This unfair situation is solved in this paper by introducing a bivariate prior distribution for the two risk parameters of the distribution of the total claim amount when the primary distribution is geometric and the secondary exponential. The joint posterior distribution as well as the marginal distribution of the total claim amount are calculated. In addition, the bonus-malus premiums under the net premium calculation principle are obtained. These expressions are written as a credibility formula with appealing interpretations. The proposed methodology is simple and it is then applied to the computation of bonus-malus premiums for a well-known automobile insurance portfolio. Comparisons are made with the classical model that does not take into account the amount in the calculation of the premium.

References

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