

Credibility Theory Based on Censoring

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Abstract

The Bühlmann model, a branch of classical credibility theory, has been successively applied at a premium estimation for group insurance contracts and other insurance specifications. In this paper we develop a robust Bühlmann credibility via the censored version of loss data, or the censored mean (a robust alternative of traditional individual mean). This framework yields explicit formulas of structure parameters in credibility for log-location-scale distribution families and their variants, which are commonly used to model the insurance risks. The asymptotic properties of the proposed method are provided and corroborated through simulations, and their performance is compared to that of credibility based on the trimmed mean. Besides, the sensitivity of the target premium is investigated by varying the censoring/trimming threshold level in several parametric distributions. And the non-parametric estimations in credibility are discussed using the theory of L- estimators. Finally, a numerical illustration indicates that the proposed robust credibility can prevent the effect caused by model mis-specification and capture the risk behavior of loss data in a broader viewpoint.