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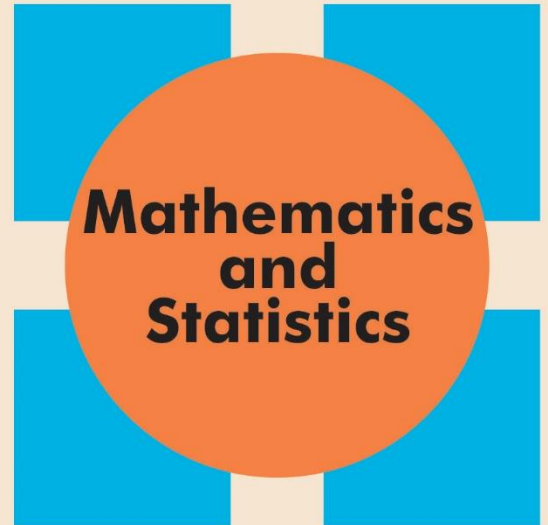
Taehan Bae
University of Regina

Mixtures of weighted distributions with stochastically ordered components and their quantiles

Mathematics and Statistics

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Abstract:

Finite mixtures have been among the most widely used approaches for modeling complex data drawn from a population composed of heterogeneous sub-populations. In particular for insurance loss modelling, several mixtures of weighted distributions such as Erlang mixture, length-biased Weibull mixture and size-biased truncated lognormal mixture, have gained popularity due to the weak-denseness property. In this talk, a review of some important properties of these mixture models will be given. Then the computation of the quantiles of a finite mixture of which mixture components are stochastically ordered, will be discussed in detail. A recursive algorithm will be introduced in which, at each step, the quantile of the mixture is expressed as that of a reduced mixture at an updated quantile level. For numerical reliability when the quantile level is either close to one or zero, forward, backward and combined methods for sequential updating will be discussed with illustrations.

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