

## On Modeling Data Sets by Means of a Modified Saddlepoint Approximation

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**Abstract :** A moment-based adjustment to the saddlepoint approximation is introduced in the context of density estimation. First applied to univariate distributions, this methodology is extended to the bivariate case. It then entails estimating the density function associated with each marginal distribution by means of the saddlepoint approximation and applying a bivariate adjustment to the product of the resulting density estimates. The connection to the distribution of empirical copulas will be pointed out. As well, a novel approach is proposed for estimating the support of distribution. As these results solely rely on sample moments and empirical cumulant-generating functions, they are particularly well suited for modeling massive data sets. Several illustrative applications will be presented.

**Keywords :** empirical cumulant-generating function, endpoints identification, saddlepoint approximation, sample moments, density estimation

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