

Error underestimation in high-statistics counting experiments with finite Monte Carlo samples

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Often in HEP analyses a distribution of high-statistics data is used to constrain the parameters of a complex model, containing the Physics parameter of interest (POI), but also several nuisance parameters describing systematic uncertainties. The model is estimated from Monte Carlo (MC) simulated samples and we show that their finite size can lead to the underestimation of the error on the POI in a way that is not accounted for by the traditional methods to correct for finite MC statistics. Additionally, we propose a way to estimate the size of this underestimation.

Summary

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