Calculation of errors in fitted quantities in likelihood fits

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Abstract

We use the likelihood ratio developed in the previous paper on “The general theory of goodness of fit in likelihood fits” and Bayes’ theorem to calculate posterior densities of fitted quantities. This then yields the surprising result that the quantity generally considered the Bayesian prior is an uninteresting constant and the resulting statistics is consistent with frequentist ideas. We work out the transformation properties of posterior densities with respect to change of variable of the fitted quantity. We describe subroutines that compute the goodness of fit in unbinned likelihood fits after the maximum likelihood fit is obtained. These can be made publicly available.