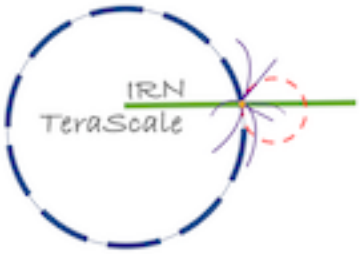

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Simplified likelihoods using linearized systematic uncertainties

mercredi 26 avril 2023 10:20 (20 minutes)

The ability to reuse published experimental results – for instance reinterpretations in the context of alternative models, or combinations of multiple results – is crucial to searches for new phenomena in high energy physics. The information that is made public, typically best-fit values, uncertainties and covariance matrices, is often insufficient to fully carry out this program, in particular in the presence of non-Gaussian effects from low event counts or correlated systematic uncertainties.

Simplified likelihoods provide an intermediate solution between this situation and the use of full likelihoods, which is often complex and computing-intensive. This talk presents a new such format, Simplified Likelihoods with Linearized Systematics (SLLS), which is complementary to other formats in current use. It preserves the Poisson nature of event-counting measurements and all the sources of systematic uncertainties of the full likelihood, which permit an accurate treatment of low event counts and correlated systematic effects. Systematic uncertainties are treated in the linear approximation, which leads to large gains in likelihood minimization performance, compared to full likelihoods.

Related publication: https://arxiv.org/abs/2301.05676

Auteur principal: BERGER, Nicolas (LAPP)

Orateur: BERGER, Nicolas (LAPP)

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