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Managing Many Simultaneous Systematic Uncertainties

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Recent statistical evaluation for High-Energy Physics measurements, in particular those at the Large Hadron Collider, require careful evaluation of many sources of systematic uncertainties at the same time. While the fundamental aspects of the statistical treatment are now consolidated, both using a frequentist or a Bayesian approach, the management of many sources of uncertainties and their corresponding nuisance parameters in analyses that combine multiple control regions and decay channels, in practice, may pose challenging implementation issues, that make the analysis infrastructure complex and hard to manage, eventually resulting in simplifications in the treatment of systematics, and in limitations to the result interpretation. Typical cases will be discussed, having in mind the most popular implementation tool, RooStats, with possible ideas about improving the management of such cases in future software implementations.

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