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Determination and validation of modeling and theory uncertainty

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I discuss how uncertainties related to machine learning modeling of a regression problem, as well as those related to missing theoretical information, can be estimated and subsequently validated. Even though these uncertainties are intrinsically Bayesian, given that there is only one underlying true theory and true model, they can be determined both in a Bayesian and frequentist framework. I show how this can be done in the context of the determination of the parton distributions that encode the structure of the proton. I further show how results can be validated by means of closure tests.

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