HAMLET
How to Apply Machine Learning to Experimental & Theoretical PHYSICS
August 19 - 21, 2024
Copenhagen, Denmark

Contribution ID: **24** Type: **Plenary**

Bayesian Model Selection of Inflationary Models Using the CONNECT Emulation Framework

Tuesday 20 August 2024 13:35 (20 minutes)

Bayesian model selection is an invaluable tool when comparing different inflationary models. This is done by computing the Bayesian evidence for the different models using nested sampling, and then comparing them using the Bayes factor. Computing the Bayesian evidence of a model using an Einstein-Boltzmann solver code takes weeks, if not months for complex models, and it is therefore very rarely done. Using a neural network, e.g. from the CONNECT framework, to emulate cosmological observables, the time used to compute the Bayesian evidence of a model can be brought down from tens of thousands of CPU hours to about 100 CPU hours.
In this talk, I will present the setup and programs used to compute the Bayesian evidence using the neural network framework CONNECT. I will also show the Bayesian evidence for the cosmological model ΛCDM+α_s+r computed with CLASS and CONNECT respectively. Furthermore, I will also present a comparison of different inflationary models using the Bayes factor.

Author: SØRENSEN, Camilla Theresia Grøn (Department of Physics and Astronomy, Aarhus University)

Co-authors: NYGAARD, Andreas (Aarhus University); HANNESTAD, Steen (Aarhus University)

Presenter: SØRENSEN, Camilla Theresia Grøn (Department of Physics and Astronomy, Aarhus University)

Session Classification: Parallel