EUROPEAN AI FOR
FUNDAMENTAL PHYSICS
CONFERENCE
EuCAIFCon 2024

Contribution ID: **120**   Type: **Flashtalk with Poster**

Clustering Considerations for Nested Sampling

Tuesday, 30 April 2024 15:45 (3 minutes)

PolyChord was originally advertised encouraging users to experiment with their own clustering algorithms. Identifying clusters of nested sampling live points is critical for PolyChord to perform nested sampling correctly. We have updated the Python interface of PolyChordLite to allow straightforward substitution of different clustering methods.

Recent reconstructions of the primordial matter power spectrum $\mathcal{P}_\mathcal{R}(k)$ with a *flex-knot* revealed that the K-Nearest-Neighbours algorithm used by PolyChord cannot reliably detect the two posterior modes caused by cosmic variance and detector resolution. After exploring a number of different algorithms, we have found the X-means algorithm to be a reliable substitute for the power spectrum reconstruction.

This work prompted the development of additions fo the post-processing tool anesthetic, allowing posterior modes corresponding to different live pint clusters to be analysed and plotted independently.

Primary author: ORMONDROYD, Adam (University of Cambridge)

Co-authors: LASENBY, Anthony (University of Cambridge); HOBSON, Mike (University of Cambridge); HANDLEY, Will (University Of Cambridge)

Presenter: ORMONDROYD, Adam (University of Cambridge)

Session Classification: 2.3 Simulation-based inference

Track Classification: Session A