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The Initial Shape of the Universe

Friday, July 1, 2022 3:00 PM (1 hour)

We want to explore the potential of topological data analysis in detecting primordial non-Gaussianity through observations of the large scale structures of the universe. As a proof of concept, we estimate the Fisher information content on primordial non-Gaussianity using halo catalogs generated from N-body simulations run with both Gaussian and non-Gaussian initial conditions. We perform several tests to verify the reliability of our Fisher matrix calculation. We find promising figures for the estimated uncertainties on primordial non-Gaussianity of the local and equilateral type, proving that TDA is indeed a promising tool for analysing galaxy surveys in search for primordial non-Gaussianity.

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