

Testing robustness of supernovae cosmological parameter inference with Gaussian process

Sunday, 11 September 2022 15:50 (10 minutes)

Inspired by the discussion in the literature about possible hidden systematic errors in late universe cosmological probes and non-trivial physical models that are developed to describe the Hubble tension we test Pantheon SNe sample for possible deviation from the baseline Λ CDM analysis. Our work is based on the assumption that this deviation can be described by a Gaussian process and we make no assumption on its origin. To simultaneously model systematics and model deviations we apply Gaussian processes to model the additional covariance while making no further assumption on its source. We explore different realizations of non-stationarity and possible redshift dependence. Using this model-independent approach we find no statistically significant evidence for missing covariance. We also test hypothesis that this process is hidden by overestimated statistical errors. We use different fittings and scaling relations for the statistical errors provided in the Pantheon sample. Inference of the Hubble parameter is robust against any treatment of covariance we explore.

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