Can Skewness and Kurtosis Measurements on Large-scale Structure Detect Primordial Non-Gaussianity?

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Skewness and Kurtosis

\[ S_3 = \frac{\langle \delta^3 \rangle}{\langle \delta^2 \rangle^2} \]

\[ S_4 = \frac{\langle \delta^4 \rangle - 3\langle \delta^2 \rangle^2}{\langle \delta^2 \rangle^3} \]
N-body Simulations

Three models:
- Local \((f_n l = 100)\)
- Equilateral
- Orthogonal

Compare to
- Gaussian
\[ \text{Residual} = \frac{S_{\text{Non-Gaussian}} - S_{\text{Gaussian}}}{S_{\text{Gaussian}}} \]
Summary

• Redshift distortions do NOT affect the chance of detecting Non-Gaussianity with $S_3$ and $S_4$.

• There are some preferred scales.

• For surveys like BOSS, skewness and kurtosis are NOT sensitive enough.