

Segmenting the Universe into dynamically coherent basins

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A methodology to partition the universe using a definition similar as watersheds was introduced in Dupuy et al. 2019 and applied to the CosmicFlows-3 observational dataset. This article explores the concept with a series of tests conducted with cosmological dark matter simulations. In particular we are interested in quantifying the evolution with redshift of large scale structures when defined as segmented basins. This new definition is a robust tool since all basins show a density contrast δ above one (mean universe density) independently of the simulation spatial resolution or the redshift. Another major finding is that density profiles of the basins show universality in slope.