Cosmological Parameters from Redshift-Space Correlations

Takahiko Matsubara Department of Physics and Astrophysics, Nagoya University, Chikusa, Nagoya 464-8602, Japan
Alexander S. Szalay Department of Physics and Astronomy, The Johns Hopkins University, Baltimore, MD 21218
taka@phys.nagoya-u.ac.jp, szalay@jhu.edu

abstract
We estimate how clustering in large-scale redshift surveys can constrain various cosmological parameters. Depth and sky coverage of modern redshift surveys are greater than ever, opening new possibilities for statistical analysis. We have constructed a novel maximum likelihood technique applicable to deep redshift surveys of wide sky coverage by taking into account the effects of both curvature and linear velocity distortions. The Fisher information matrix is evaluated numerically to show the bounds derived from a given redshift sample. We find that intermediate-redshift galaxies, such as the Luminous Red Galaxies (LRGs) in the Sloan Digital Sky Survey, can constrain cosmological parameters, including the cosmological constant, unexpectedly well. The importance of the dense as well as deep sampling in designing redshift surveys is emphasized.