VOIDS IN THE 2D CFA CATALOG

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The void probability function was known from a long time to be an efficient tool in analysing the galaxy repartition (White, Sharp, Schaeffer). We developed a method to determine this quantity with a minimum noise, for any proposed distribution resulting from observations, simulations, or theory. We apply it here to the 2D-CFA catalog. This will be later compared to other 2D galaxy catalogs, to the 3D CFA catalog and to the results of numerical simulations.

The void probability $P(\Omega)$ is defined (in 2 dimensions) as the probability that a randomly chosen zone of the sky, of solid angle Ω contains no galaxy. We measure it in the sample as a function of Ω. The method and the error estimates will be presented in a subsequent paper (Bouchet and Lachièze-Rey 1985). The estimated noise appears however to be very low. The complete results will be presented in Bouchet and Lachièze-Rey (1985).

In order to compare them to theoretical predictions they were expressed as functions of the scaling variable $q = \sigma\Omega \cdot (\theta)\bar{W}(\theta)$ where $\bar{W}(\theta)$ is the averaged 2-point angular correlation function (see Schaeffer 1984).

We present in the figure the result of our measure, compared with the theoretical predictions of Schaeffer (1984). All models $\nu \neq 1$ are excluded. The difference with $\nu = 1$ may be due to a bad estimation of the scaling variable q. It remains that the good fit up to $\theta = 1.2°$ is significant and has to be explained.

In conclusion we point out that we are able to estimate $P(\Omega)$ with a very good precision; this provides a very efficient and powerful tool to compare observational, computational and theoretical work. The fact that we are able to exclude some models which reproduce the low order correlations functions is very encouraging. On the other hand, the fit, although presently imperfect, between the data and the prediction of $\nu = 1$ Schaeffer's model is stimulating and appeals for more theoretical work on interpreting $P(\Omega)$.

References

Bouchet F. and Lachièze-Rey M., 1985, in preparation for ApJ Letters
Schaeffer R., A&A, 134, L15
Sharp N., 1981, MNRAS, 195, 857
White S., 1979, MNRAS, 186, 145

J. Kormendy and G. R. Knapp (eds.), Dark Matter in the Universe, 282.

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