On the Comment on “CCC-predicted low-variance circles in CMB sky and LCDM”, by H.K. Eriksen and I.K. Wehus

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Abstract

In [1], Eriksen and Wehus try to criticise the use of Kolmogorov’s stochasticity parameter (KSP) for CMB data analysis. Their discussion is based on a serious misunderstanding of the randomness and Arnold’s work. Their note includes numerous further inaccuracies and groundless statements. However, this short note is concerned with KSP method only.

How does one know if a finite sequence of real numbers is random or non-random? No doubts that nobody would agree with handwaving arguments in [1].

Without defining randomness or providing meaningful arguments, not to say about doing alternative computations, Eriksen and Wehus write: “When reading these papers, it seems clear to us that Gurzadyan et al. confuse randomness with correlation: While the CMB field is (most likely) a random field, it is not uncorrelated. Instead, the CMB field is a smooth field on scales comparable with the instrumental beam, and it has a well-defined non-flat power spectrum. Thus, the real-space correlations are strong. Of course, the instrumental noise is virtually uncorrelated, and so there are indeed two components here, one correlated and one uncorrelated. But neither is non-random.”

This is not how scientific questions are addressed. Arnold shows how it is properly done in [2], [3], [4], [5]. The stochastic parameter and the statistic introduced by Kolmogorov [6] is applied to measure the objective stochasticity degree of datasets. He proves that KSP method is mathematically sound, non-trivial, and universal.

For instance, the following sequence

\[ A = \{3, 9, 27, 81, 43, 29, 87, 61, 83, 49, 47, 41, 23, 69, 7\}, \]

looks as random as the sequence

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1All emphasis are ours.
Arnold shows, using KSP method, that randomness probability is higher for $A$ than for $B$ \cite{Arnold2008}.

The approach in \cite{Gurzadyan2008} is based on a solid ground built by Kolmogorov and Arnold. One has to comprehend their work before trying to criticise the estimation of the random component in the CMB \cite{Gurzadyan2011}; and for that matter also \cite{Gurzadyan2011Penrose}.

References

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