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BAYESIAN ASPECT OF FERMI PARADOX

Abstract

In this study, we present an approach of how to summarize the current status of SETI research regarding various possible solutions of Fermi paradox. First, we collect existing possible explanations of Fermi paradox in the form of mathematical models with particular parameters. Second, we construct the likelihood function, a multivariate probability distribution, as a hierarchical Bayesian model, one of which parameters is integer number of a possible solution of Fermi paradox. Then we summarize the existing SETI evidence in the homogeneous numerical form. After this, we perform an affine-invariant Markov chain Monte Carlo modeling to obtain a posterior distribution for the model index to prefer one Fermi paradox solution among others, as well as posterior distribution for model parameters. The results show that the existing SETI evidence cannot suggest a possible solution of Fermi paradox which Bayesian factor is significant enough to prefer it among other models.