Shannon Entropy: An omnipresent quantity and its application in
goodness of fit tests for generalized families of distributions

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Shannon entropy and its by products is an omnipresent quantity with applications in almost every branch of science and engineering. The maximum entropy principle (MEP) is a general method of inference, it is developed on the basis of Shannon entropy and it provides with a tool to approximate the unknown probabilistic model which is in harmony with some prior information about it. It is successfully applied in statistics and econometrics. Shannon entropy and the MEP have been used to develop goodness of fit tests, among many other applications. On the other hand, the last decade is characterized by the definition and the study of broad families of distributions which compose properties of two or more probability distributions. These generalized families provide with great flexibility in modeling real data.

In the first part of this talk the concepts of Shannon entropy, the maximum entropy principle and the beta – and gamma – generated distributions will be presented and critically discussed. In the second part of the talk a goodness of fit test will be developed inside the broad family of the beta – generated distributions. The proposed test procedure is based on a sample-spacings non-parametric estimator of Shannon entropy. Some properties of the proposed test will be presented and a simulation study is performed in order to compare the proposed procedure with competitive tests.