

Turkish Journal of Mathematics

Turkish Journal

of

Mathematics

Maximum Entropy-Based Fuzzy Clustering by Using L_1 -norm Space

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Abstract: One of the most important methods in analysis of large data sets is clustering. These methods are not only major tools to uncover the underlying structures of a given data set, but also promising tools to uncover local input-output relations of a complex system. The goal of this paper is to present a new approach to fuzzy clustering by using L_1 -norm space by means of a maximum entropy inference method, where, firstly, the resulting formulas have more beautiful form and clearer physical meaning than those obtained by means of FCM method and secondly, the obtained criteria by this new method are very robust. In order to solve the cluster validity problem and choosing the number of clusters in fuzzy clustering, we introduce a structure strength function as clustering criterion. With the proposed structure strength function, we also discuss the global minimum problem in terms of simulating methods.

Key Words: Fuzzy c-means, Maximum Entropy, Structure Strength, Number of Clusters, L_1 -norm Space

Turk. J. Math., **29**, (2005), 431-438.

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