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FCM CLUSTERING BASED ON ANT ALGORITHM AND ITS APPLICATION

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Abstract. *Stock category is an important issue in stock analysis, Ant clustering algorithm and Fuzzy C-Means (FCM) are two commonly used technologies for studying this problem. However, there are some limits when just use each of them alone. Although the traditional ant clustering algorithm is capable of global searching and parallel computing, it also exist many problems including long time of clustering, poor convergence accuracy and so on. On the other hand, FCM is an effective clustering method, but it can not determine clustering number as well as clustering center by itself, which result will immerse into part optimal solution easily. So, we try to combine ant algorithm and FCM method to analyze the issue of stock categories. Ant algorithm is used to determine the clustering number and clustering center, and clustering process can be dealt with FCM clustering algorithm. The results show that this new method can overcome the deficiencies of each single method and is more reliable.*

Keywords: Stock categories, Ant clustering, FCM clustering

1. **Introduction.** Since the 1990s, people have realized that they should manage their investment not only based on asset price forecasts but also focus on how to choose the asset and determine the optimal portfolio [1-3].Thus, stock categories has become a hot research area since then. The investors can understand better the income and also the risk of stocks by classifying the stock systematic [4-6], which guide them to choose proper stocks scientific.

FCM algorithm, posed by Bezkek in1981, is widely used for clustering. The main idea of this method is to make the objects in the same division have maximum similarity and those in different divisions have minimum similarity [7-10]. It is an effective fuzzy clustering algorithm which can get the degree of sample membership belonged to each clustering [11], and also can cluster even the variables which are difficult to classify obviously [12]. But it also exists some problems, including the artificial preestablish of the fuzzy weighted index and clustering number which have tremendous influence on fuzzy clustering result [13,14].

Ant algorithm (ant colony optimization, ACO), on the other hand, is a kind of probability technology which is used to find the optimal path. It was supposed by Marco Dorigo in his doctoral thesis, and the inspiration came from the behavior of ants when they searching food. In the nature, although the food source distribute randomly around ant nests, they can find the shortest path between nest and food source. In the process of food