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Modularity cluster finding in financial time series

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Abstract

In this paper, relying on the clustering of complex networks that can determine large scale features of the network, we study 48 financial markets across the world. To this end, we develop a modularity maximization method for directed and weighted networks. According to the linear correlation measure, we construct the adjacency matrix, and by using the theory of random matrices, we divide the space of eigenvalues of our matrix into two irrelevant and relevant fragments. By considering the temporal window and its evolution over time series, our results demonstrate that in the vicinity of so-called financial crisis clusters, which are often affected by geographical characteristics, are formed and from the perspective of complex networks, they show more random behavior.

Keywords: econophysics, complex network, clustering, modularity maximization, random matrix theory

For full article, refer to the Persian section