模糊資料之相關係數研究及其應用

中文摘要

近年來，由於人類對自然現象、社會現象或經濟現象的認知意識逐漸產生多元化的研判與詮釋，也因此致使人類思維數據化的概念已逐漸廣泛的被應用，對數據分析已從傳統以單一數值或平均值的分析作法，演變為考量多元化數值的分析作為。有鑑於此，在數據資料具備「模糊性」特質的現今，藉由模糊區間的演算方法，進一步探討之間的關係。

傳統的統計分析，對於兩變數間線性關係的強度判斷，一般是藉由皮爾森相關係數（Pearson's Correlation Coefficient）的方法予以衡量，同時也可以經由係數的正、負符號判斷變數間的關係方向。然而，在現實生活中無論是環境資料或社會經濟資料等，均可能以模糊的資料型態被蒐集，如果當資料型態係屬於模糊性質時，將無法透過皮爾森相關係數的方法計算。

因此，本研究欲研擬一個較簡而易懂的方法，計算模糊區間資料的相關係數，據以呈現兩組模糊區間資料的相互影響程度。此外，若時間性之模糊區間資料被蒐集之際，我們亦提出利用中心點與長度之模糊自相關係數（ACF with the Fuzzy Data of Center and Length；簡稱 CLACF）及模糊區間資料之自相關函數(ACF with Fuzzy Interval Data；簡稱 FIACF)的方法，探討時間性模糊資料的自相關係數予以衡量。

關鍵詞：模糊區間、模糊區間相關係數、模糊區間自相關係數

Evaluating Correlation Coefficient with Fuzzy Data and Its Applications

Abstract

The classical Pearson's correlation coefficient has been widely adopted in various fields of application. However, when the data are composed of fuzzy interval values, it is not feasible to use such a traditional approach to evaluate the correlation coefficient. In this study, we propose the specific calculation of fuzzy interval correlation coefficient with fuzzy interval data to measure the relationship between various stocks.

In addition, in time series analysis, the auto-correlation function (ACF) can evaluate the effect of stationary for time series data. However, as the fuzzy interval data could be occurred, then the classical time series analysis will be not applied. In this paper, we proposed two approaches, ACF with the fuzzy data of center and length (CLACF) and ACF with fuzzy interval data (FIACF), to calculate the auto-correlation coefficient for fuzzy interval data, and use the scheme of Mote Carlo simulation to illustrate the effect of evaluation methods. Finally, we offer empirical study to indentify the performance of CLACF and FIACF which may measure the effect of lagged period of fuzzy interval data for daily price (low, high) of the Centralized Securities Trading Market and the result show that the effect of evaluation lagged period via CLACF and FIACF may response the effect more easily than classical evaluation of ACF for the close price of Centralized Securities Trading Market.

Keywords: Fuzzy interval correlation, Fuzzy data, Auto-Correlation coefficient.