

Abstract of thesis entitled:

Comparing Relative Predictive Power through Squared Multiple Correlations in Within-Sample Regression Analysis

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One major question in multiple linear regression analysis is to determine the relative predictive power of two different sets of predictors (\mathbf{X} and \mathbf{Z}) on a common criterion variable within the same population. Currently there is no formula to estimate the standard error of $R_x^2 - R_z^2$ so statistical inference cannot be made. This study was to provide an empirical solution to this problem and construct a confidence interval for $\rho_x^2 - \rho_z^2$ applying bootstrap procedure. Simulation results showed that both the bootstrap percentile interval (BP) and the bootstrap standard interval (BCI) in general work well under normal data. However, BP outperformed BCI for nonnormal data. When $\rho_x^2 = \rho_z^2 = 0$, the method broke down.

摘要

在多元綫性迴歸分析中，於同一總體內比較兩組不同自變量群 (\mathbf{X} 跟 \mathbf{Z}) 對一共同因變量的預測能力是一個重要的課題。因為迄今為止仍沒有公式估計 $R_x^2 - R_z^2$ 的標準誤差，所以科學家不能作出任何統計性推論。本研究旨在應用拔靴法 (bootstrap) 估計 $R_x^2 - R_z^2$ 的標準誤差，藉此建設 $\rho_x^2 - \rho_z^2$ 的置信區間 (confidence interval)。模擬結果顯示 bootstrap percentile interval (BP) 跟 bootstrap standard interval (BCI) 在正態數據下表現良好，但如果數據為非正態分佈，則 BP 較 BCI 優勝。此方法並不適用於 $\rho_x^2 = \rho_z^2 = 0$ 的情況。