摘 要

随机变量的独立性非参数假设检验一直以来就是统计学上比较关注的问题。Jing 和 Zhu(1996) 提出了基于 pp 法和 bootstrap 法的一种 B-K-R 型检验统计量。Norbert Henze 和 Ya.Yu.Nikitin(2003) 引入了积分经验过程。Jing 和 Wang（2006）利用积分经验过程检验多元分布函数的相等性。本文在这些文章的基础上，提出了高维情况下基于投影积分经验过程的 Kolmogorov-Smirnov 和 Cramer-VonMises(C-V) 检验统计量检验随机变量的独立性。Bootstrap 统计量用于逼近所提出的统计量的临界值, 并证明了在原假设成立时他们有相同的经验分布。数论的方法用于有效的计算 bootstrap 临界值。最后本文给出了大量的数值模拟。

关键词：Bootstrap 统计量，积分经验分布函数，积分经验过程

Abstract

Testing the joint independence of variables has long been an interesting issue in statistical inference.Jing and Zhu(1996) proposed B-K-R type tests based on the projection pursuit technique and bootstrap method.Henze and Ya.Yu.Nikitin(2003) introduced the integrated empirical processes.Jing and Wang(2006) used the integrated empirical processes to test the equality of multivariate distributions.Based on the above ,in this paper we will introduce the projected integrated empirical processes of Cramer-VonMises statistics and Kolmogorov-Smirnov statistics for testing the joint independence of variables in high dimension space.The bootstrap is used for determining the approximate critical values. An approximation is derived by Number-theoretic method for the bootstrap statistics suggested. Several simulation experiments are performed.

Key words：Bootstrap，Kolmogorov-Smirnov statistics