# 國立中山大學應用數學系
# 學術演講

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講　題：Comparative Analysis of Bootstrap Techniques for Confidence Interval Estimation in Spatial Covariance Parameters with Large Spatial Data

時　間：2025/4/17（Thursday）14:10 ~ 15:00

地　點：理 SC 4009-1 教室

茶　會：13:45


**Abstract**

Inconsistent estimation issues in the Mat´ern covariance function pose significant challenges to con structing confidence intervals using traditional methods. This paper addresses these challenges by employing the bootstrap method and comparing two straightforward approaches: the percentile bootstrap (PB) and the reverse percentile interval (RPI). We assess their efficacy through cover age rates and interval scores, focusing on accuracy and breadth. Theoretically, we prove that PB outperforms RPI, a claim substantiated by simulation experiments showing its superior coverage accuracy and interval scores. Moreover, the simulation results show strongly interdependent phe nomena between parameters. Accordingly, by exploring the micro-ergodic parameter's impact, the study provides insights into these findings' underlying factors, particularly relevant for large spa tial datasets. In the empirical study, our approach exhibits greater reliability and effectiveness in confidence interval estimation for large datasets with uniformly and non-uniformly distributed lo cations, as compared to several other methods. Furthermore, we applied the method to sea surface temperature data, demonstrating its strong applicability for analysis. This study provides theoret ical insight and practical guidance for constructing confidence intervals, particularly in mitigating inconsistent estimation issues, especially in the context of the Mat´ern covariance function.


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