

## Testing Methods of Mean Difference for Longitudinal Data Based on Stationary Bootstrap

Hirohito Sakurai\*

National Center for University Entrance Examinations, Tokyo, Japan  
[sakurai@rd.dnc.ac.jp](mailto:sakurai@rd.dnc.ac.jp)

Masaaki Taguri

Chuo University, Tokyo, Japan [taguri@indsys.chuo-u.ac.jp](mailto:taguri@indsys.chuo-u.ac.jp)

We propose testing methods for detecting the difference of two mean curves in longitudinal data using the stationary bootstrap when the data of two groups are not paired. For the detection of mean difference of two groups, we here consider the following four types of test statistics: (i) sum of absolute values of difference between two mean sequences, (ii) sum of squares of difference between two mean sequences, (iii) estimator of area-difference between two mean curves, and (iv) difference of kernel estimators based on two mean sequences. The stationary bootstrap is used to approximate the null distribution of each test statistic. Our approaches of block resampling generate a resample with replacement from blocks of observations. Monte Carlo simulations are conducted in order to investigate finite sample behavior of the sizes and powers of the proposed tests. We also show an example of how to use the above methods for analyzing a real data.

**Key Words:** Block resampling, comparison of mean curves, sizes and powers of tests