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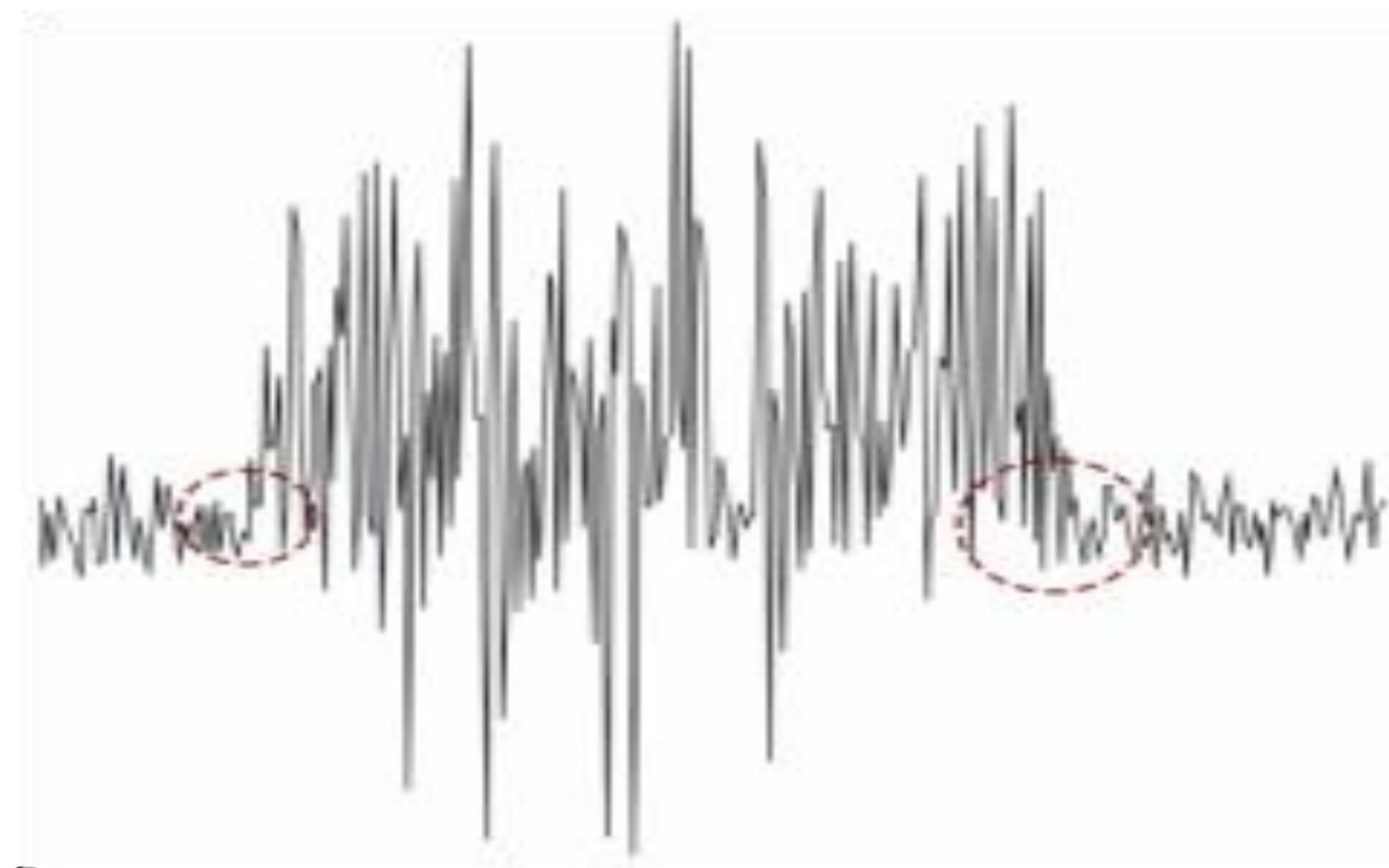
Detecting Performance Degradation in Code Based on Execution Times of Unit Tests

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Background

Change point detection (CPD) is an important area of time series research today. In many real-world applications, there is need for determining when a non-random shift in a sequence of data points occurs. CPD attempts to answer that question.



This work aims at detecting performance decrease in univariate time series data based on execution times of a large number of unit tests.

The Non-Parametric Approach

We propose a non-parametric approach to CPD. When data cannot be fitted to a certain distribution, non-parametric alternatives offer several advantages compared to parametric methods.

We investigate three such methods: the standard bootstrap, the stationary bootstrap, and the density based Kullback-Leibler Importance Estimation Procedure (KLIEP).

Detecting a Change Point

Partition the data series into two consecutive time intervals: the reference and test interval. Determine whether the intermediate point is a potential change point using an appropriate statistical test.

Results

Performance is measured based on type I and type II errors for a stationary data set (Figure 1) and an artificial non-stationary data set (Figure 2), respectively.

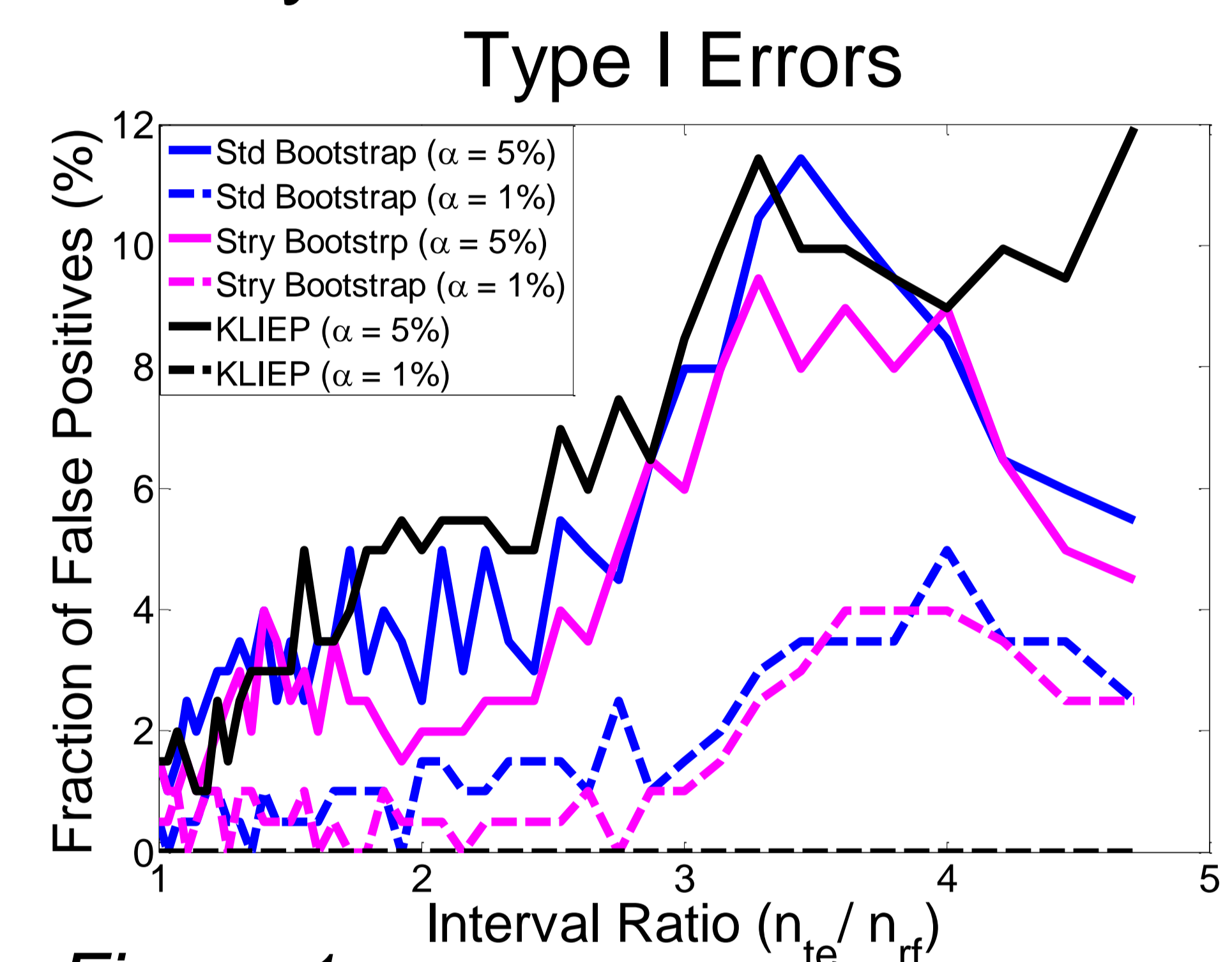


Figure 1.

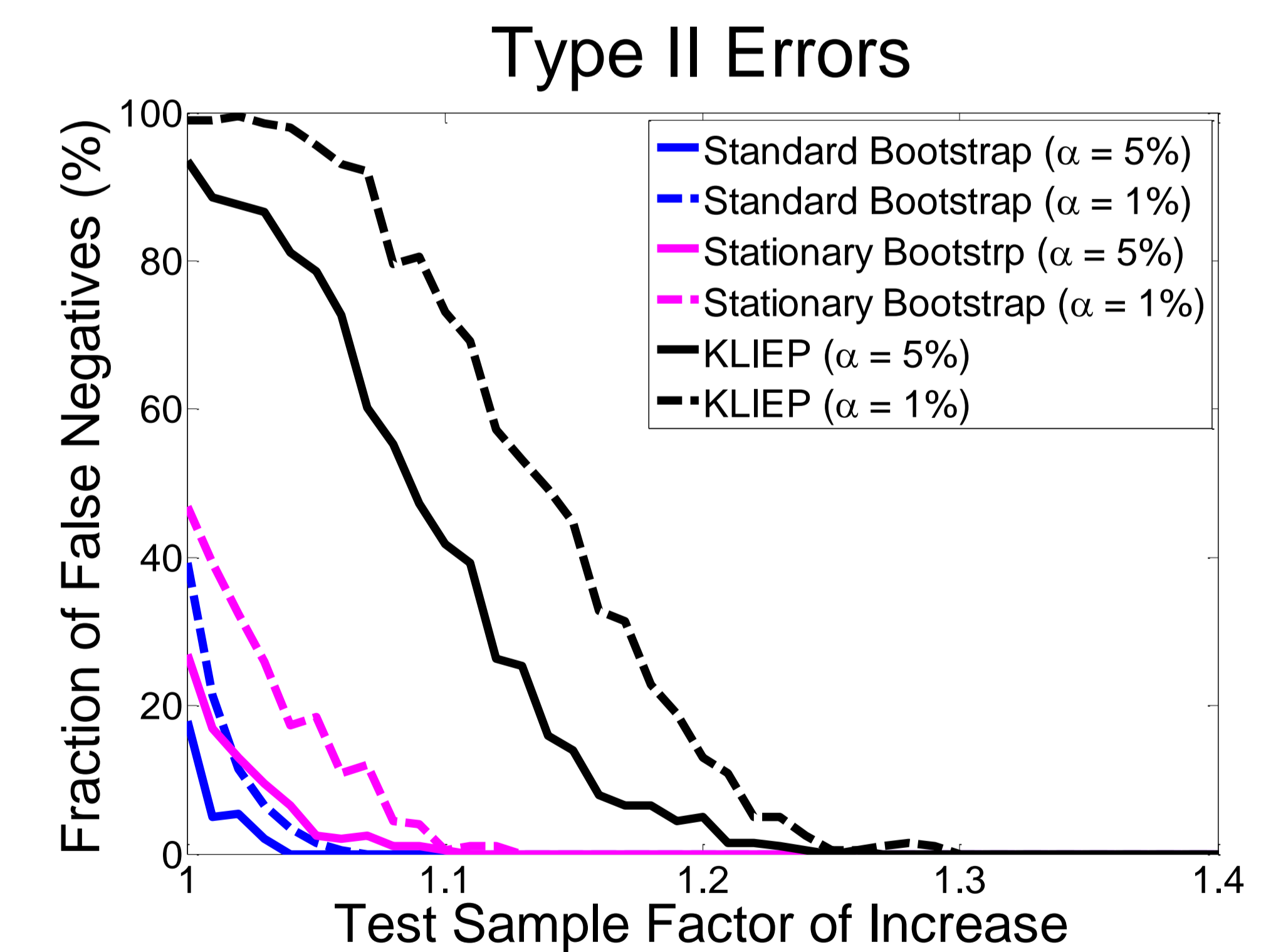


Figure 2.

Conclusion

The standard and stationary bootstrap methods both outperformed KLIEP. Moreover, the standard bootstrap yielded slightly fewer type II errors than the stationary bootstrap.