
SEQUENTIAL HYPOTHESIS TESTING UNDER CONTINUOUS MONITORING: SEQUENTIAL E-VALUES AND SEQUENTIAL P-VALUES

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ABSTRACT

Sequential A/B testing is a statistical framework used to compare two competing options as data are collected over time. Unlike traditional fixed-sample testing, it is possible to analyse data continuously as data accumulate. During data collection, the available evidence is evaluated to make a decision on whether the two competing options differ or whether additional data should be collected. Because the decision is based on randomly observed data, a formal statistical hypothesis testing framework is required. This decision procedure can be formulated as a sequential hypothesis testing problem.

In this study, two sequential decision approaches, sequential p-value and sequential e-value, are compared for sequential A/B testing under continuous monitoring. The considered framework assumes that observations arrive sequentially and the corresponding outcomes are binary. The performances of these two decision approaches are compared through Monte Carlo simulations under various scenarios.

Keywords Sequential A/B testing · Continuous monitoring · Sequential hypothesis testing · Sequential p-value · Sequential e-value

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