

# Sequential Implementation of Monte Carlo Tests with Uniformly Bounded Resampling Risk

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This talk describes an open-ended sequential algorithm for computing the p-value of a test using Monte Carlo simulation, e.g. a bootstrap test. The algorithm guarantees that the resampling risk, the probability of a different decision than the one based on the theoretical p-value, is uniformly bounded by an arbitrarily small constant. Previously suggested sequential or non-sequential algorithms, using a bounded sample size, do not have this property. Although the algorithm is open-ended, the expected number of steps is finite, except when the p-value is on the threshold between rejecting and not rejecting. The algorithm is suitable as standard for implementing tests that require (re-)sampling. It can also be used in other situations: to check whether a test is conservative, iteratively to implement double bootstrap tests, and to determine the sample size required for a certain power.

An R-package implementing the algorithm will be discussed.

## References

- Gandy, Axel (2008). Sequential implementation of Monte Carlo tests with uniformly bounded resampling risk. Preprint.  
<http://arxiv.org/abs/math.ST/0612488>.