SEQUENTIAL FIXED-WIDTH CONFIDENCE INTERVAL FOR THE PRODUCT OF TWO MEANS

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Abstract. For the product of two population means, the problem of constructing a fixed-width confidence interval with preassigned coverage probability is considered. It is shown that the optimal sample sizes which minimize the total sample size and at the same time guarantee a fixed-width confidence interval of desired coverage depend on the unknown parameters. In order to overcome this, a fully sequential procedure consisting of a sampling scheme and a stopping rule are proposed. It is then shown that the sequential confidence interval is asymptotically consistent and the stopping rule is asymptotically efficient, as the width goes to zero. Furthermore, a second order result for the difference between the expected stopping time and the (total) optimal fixed sample size is established. The theoretical results are supported by appropriate simulations.

Key words and phrases: Coverage probability, fully sequential procedure, sampling scheme, asymptotic consistency, asymptotic efficiency, uniform integrability.