

Local asymptotic efficiency of a sequential probability ratio test for d-guarantee discrimination of composite hypotheses

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Abstract

A sequential Wald test for discrimination of two simple hypotheses $\theta = \theta_1$ and $\theta = \theta_2$ with boundaries A and B is applied to distinguish composite hypotheses $\theta < \theta_0$ and $\theta > \theta_0$, the parameters θ_1 , θ_2 , A, and B being chosen in such a way that d-posteriori probabilities of errors do not exceed the given restrictions β_0 and β_1 . An asymptotic behavior of boundaries A, B and the average observation time are studied when $\beta = \max\{\beta_0, \beta_1\} \rightarrow 0$. An asymptotic ($\beta \rightarrow 0$) comparison is made of $E\theta_v$ with the least given number of observations necessary for discrimination of composite hypotheses with the same restrictions β_0 , β_1 on d-posteriori probabilities of errors. It is shown that the minimum (in a neighborhood of the point $\theta = \theta_0$) gain of the average observation time makes up 25%. Therefore, there are sequential tests within the bounds of a d-posteriori approach that give a gain in the size of observations for every value of a parameter tested.

Keywords

Asymptotic efficiency, Average size of observations, Bayesian paradigm, d-guarantee, d-posteriori approach, Discrimination of composite hypotheses, Necessary size of a sample, Regular statistical experiments, Sequential tests, Strict restrictions on d-risks