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Asymptotic solution of a problem of search for a signal in a multichannel system. (Russian)

Zbl 0712.62017
Mat. Issled. 109, 15-35 (1989).

[For the entire collection see Zbl 0664.00021.]

Consider a system with k ($k > 1$) channels, where the observed output of the i-th channel is a random process $X^i = \{X_t^i\}$, e.g. a Wiener process, $t \in R^+$ or $t \in Z^+$. Assume that these processes are independent. Let the distribution of X^i depend on an unknown parameter ϑ_i, where $\vartheta_i \in \{\mu_0, \mu_1\}$; $\vartheta_i = \mu_0$ means that the considered signal does not appear in the i-th channel and $\vartheta_i = \mu_1$ means the other case, respectively.

Two extreme situations are possible: to analyse only one channel or simultaneously all channels, respectively. A further problem consists in the control of the observation process. The aim of this paper consists in the construction of a statistical test to check the hypothesis $H_i : \vartheta_i = \mu_1$, $\vartheta_j = \mu_0$, $\forall j \neq i$, or $H_0 : \vartheta_j = \mu_0$, $\forall j$ (the signal is missing in the system) and in the proof of an asymptotical optimality criterion.

Reviewer: L.Paditz

MSC:

62F05 Asymptotic properties of parametric tests
94A40 Channel models (including quantum) in information and communication theory
60G35 Signal detection and filtering (aspects of stochastic processes)

Keywords:

multichannel system; Wiener process; asymptotical optimality criterion

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