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Local asymptotic mixed normality of log-likelihood based on stopping times. (English)

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Bull., Calcutta Stat. Assoc. 37, No. 147-148, 143-159 (1988).

Summary: Let Θ, the parameter space, be an open subset of R^k, $k \geq 1$. For each $\theta \in \Theta$ let the r.v.'s X_m, $m = 1, 2, ...$ be defined on the probability space $(\mathcal{X}, A, P_\theta)$ and take values in space (S,ζ), where S is a Borel subset of a Euclidean space and ζ is the σ-field of Borel subsets of S. It is assumed that the joint probability law of any finite set of such r.v.'s $\{X_m,\ m \geq 1\}$ has some known functional form except the unknown parameter θ. For $h \in R^k$ and a sequence of p.d. matrices $\delta_n = \delta_n^{k\times k}(\theta_0)$ set $\theta_n^* = \theta^* = \theta_0 + \delta_n^{-1} h$, where θ_0 is the true value of θ, as one value of θ. For each $n \geq 1$, let ν_n be stopping time defined on the process, with some desirable properties. Let $\Lambda_m(\theta^*, \theta_0)$ be the log- likelihood ratio of the probability measure $P^w_{m\theta^*}$.r.t. the probability measure $P_{m\theta_0}$, where $P_{m\theta}$ is the restriction of P_θ on $A_m = \sigma < X_1, X_2, ..., X_m >$. Replacing m by ν_n in $\Lambda_m(\theta^*, \theta_0)$ we get the randomly stopped log-likelihood ratio, namely $\Lambda_{\nu_n}(\theta^*, \theta_0)$.

The main purpose of this paper is to show that under certain regularity conditions the limiting distribution of $\Lambda_{\nu_n}(\theta^*, \theta_0)$ is locally asymptotically mixed normal. Two examples are also taken into account.

MSC:

62E20 Asymptotic distribution theory in statistics

Cited in **3** Documents

Keywords:

asymptotic normality; stopping time; randomly stopped log-likelihood ratio; locally asymptotically mixed normal

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