

HIGHER ORDER ASYMPTOTICS IN ESTIMATION FOR TWO-SIDED WEIBULL TYPE DISTRIBUTIONS

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(Received May 18, 1988; revised January 25, 1989)

Abstract. We consider the estimation problem of a location parameter θ on a sample of size n from a two-sided Weibull type density $f(x - \theta) = C(\alpha) \exp(-|x - \theta|^\alpha)$ for $-\infty < x < \infty$, $-\infty < \theta < \infty$ and $1 < \alpha < 3/2$, where $C(\alpha) = \alpha/\{2\Gamma(1/\alpha)\}$. Then the bound for the distribution of asymptotically median unbiased estimators is obtained up to the 2α -th order, i.e., the order $n^{-(2\alpha-1)/2}$. The asymptotic distribution of a maximum likelihood estimator (MLE) is also calculated up to the 2α -th order. It is shown that the MLE is not 2α -th order asymptotically efficient. The amount of the loss of asymptotic information of the MLE is given.

Key words and phrases: 2α -th order asymptotically median unbiased estimator, 2α -th order asymptotic distribution, 2α -th order asymptotic efficiency, Edgeworth expansion, maximum likelihood estimator.