BOOTSTRAPPING EXTREMES OF I.I.D. RANDOM VARIABLES

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Abstract

Let $X_1, X_2, \cdots$ be i.i.d. random variables with common distribution function F. Define $X_{n:n} \equiv \max(X_1, X_2, \ldots X_n)$. Assume that there exist $a_n > 0, b_n \in \mathbf{R}, n \geq 1$ such that $G_n(x) \equiv P\{a_n(X_{n:n} - b_n) \leq x\}$ converges to one of Gnedenko's extreme value distributions. In this paper the problem of estimating $G_n(x)$ by the bootstrap technique is considered. We define different bootstrap distributions for different types of domain of attraction that F belongs to. It is shown that both when a_n and b_n are known and when a_n and b_n are estimated from the data the bootstrap distribution is weakly consistent if m=o(n) and it is strongly consistent if m=$o(\frac{n}{\log n})$. These results are applied to the problem of obtaining confidence intervals for the upper endpoint of the support of F.