EDGEWORTH EXPANSIONS FOR L-STATISTICS

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Abstract: We study the approximation by a short Edgeworth expansion of the distribution function of normalized linear combinations

$$\frac{1}{\sqrt{n}} \sum_{j=1}^{n} c_{jn} X_{j:n}$$

of order statistics of n independent random variables with common distribution function F. Under the assumptions

$$|c_{jn}| \le C n^{-p_1} \left[\frac{j}{n} \left(1 - \frac{j-1}{n} \right) \right]^{-p_2},$$

$$|c_{jn} - c_{j-1,n}| \le C n^{-q_1} \left[\frac{j}{n} \left(1 - \frac{j-1}{n} \right) \right]^{-q_2},$$

$$|c_{j+1,n} - 2c_{jn} + c_{j-1,n}| \le C n^{-r_1} \left[\frac{j}{n} \left(1 - \frac{j-1}{n} \right) \right]^{-r_2},$$

$$(F^{-1})'(s) \le C[s(1-s)]^{-\kappa}$$

for some $p_1, q_1, r_1 \in \mathbf{R}$, $p_2, q_2, r_2, C \ge 0$, $\kappa \in [0, 5/4)$, with an appropriate balance in these parameters, and under additional moment conditions, the rate of uniform convergence is shown to be of order n^{-1}. Moreover, a special case is considered where the c_{jn} are generated by a sequence of weight functions of a special structure.

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