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NONPARAMETRIC CONFIDENCE INTERVALS FOR FUNCTIONS OF SEVERAL DISTRIBUTIONS

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Abstract. Let $F=(F_1 \cdots F_k)$ denote k unknown distribution functions and $\hat{F}=(\hat{F}_1 \cdots \hat{F}_k)$ their sample (empirical) functions based on random samples from them of sizes $n_1, \ldots, n_k$. Let $T(F)$ be a real functional of F. The cumulants of $T(\hat{F})$ are expanded in powers of the inverse of n, the minimum sample size. The Edgeworth and Cornish-Fisher expansions for both the standardized and Studentized forms of $T(\hat{F})$ are then given together with confidence intervals for $T(F)$ of level $1-\alpha+O(n^{-j/2})$ for any given α in $(0,1)$ and any given j. In particular, confidence intervals are given for linear combinations and ratios of the means and variances of different populations without assuming any parametric form for their distributions.

Key words and phrases: Confidence interval, nonparametric, Cornish-Fisher expansions, functional derivatives.