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ABSTRACTS OF PAPERS

(*Abstracts of papers to be presented at the Central Regional meeting, Dallas, Texas, April* 8–10, 1970. *Additional abstracts will appear in future issues.*)

124-4. Exact partitioning of chi-square using successive likelihood ratios.

WANZER DRANE, RONALD B. HARRIST AND PAUL E. WEST, Southern Methodist University.

Wilks' likelihood ratio chi-square has been reserved primarily for testing a single hypothesis against a single alternative. It is shown here that this need not be the case. In fact, the requirement that when using the likelihood ratio the two parameter spaces be imbedded, one in the other, suggests a succession of parameter spaces, each imbedded in the succeeding one. This imbedding and the method of calculating the chi-square give rise to an exact partitioning of the resulting Total Chi-square. Thus, a Chi-square Table can be constructed very much with the same demeanor as the ANOVA tables are. It is well known that this "Chi-square" is only asymptotic. Its characteristics, however, are dependent primarily on total sample size and the assumed distribution and not, as in the case with contingency tables and the Pearson chi-square, individual cell size.

To illustrate its universality an example is given using non-linear regression with contingency tables. (Received January 5, 1970.)

(*Abstracts of papers to be presented at the Eastern Regional meeting, Chapel Hill, North Carolina, May* 5–7, 1970. *Additional abstracts will appear in future issues.*)

125-4. A central limit theorem with nonparametric applications.

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Many nonparametric test and/or confidence procedures are (or can be) based on statistics of the type $S=\sum_{i\in I}\sum_{j\in J} v_{ij}$ where the v_{ij} are $(0,1)$-variables and two random variables v_{ij} and v_{gh} are known to be independent when no subscript in the (i,j)-pair matches a subscript in the (g, h)-pair. Suppose that the number of elements in I and J depend (linearly) on some index N. We are interested in the limiting distribution of the statistic S as $N\rightarrow\infty$. THEOREM. *A sufficient condition for the asymptotic normality of S (under proper normalization) is that* $\operatorname{Var} S$ *is of order* N^3. The proof consists in showing that the moments of normalized S converge to the moments of the standard normal distribution. This proof remains valid for arbitrary random variables v_{ij} that are uniformly bounded. (Received November 14, 1969.)

125-5. On bounded length sequential confidence intervals based on one-sample rank-order statistics.

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The problem of finding a bounded length confidence band for the mean of an unknown distribution (having finite second moment) is studied by Anscombe [*Proc. Cambridge Philos. Soc.* **48** (1952) 600–607] and by Chow and Robbins [*Ann. Math. Statist.* **36** (1965) 457–462]. In the present paper, we consider the problem of providing a similar (sequential) confidence interval for the median of a symmetric (but otherwise unknown) distribution based on a general class of one-sample rank order statistics. Of particular interest is the procedure based on the one-sample normal scores statistics. This procedure is shown to be asymptotically (i.e., as the prescribed bound on the width of the confidence interval is made to converge to zero) at least as efficient as the Chow–Robbins procedure for a broad class of parent distributions. In this context, several useful convergence