ABSTRACTS OF PAPERS

(Abstracts of papers presented at the Central Regional meeting, Lafayette, Indiana, March 23–25, 1966. Additional abstracts appeared in the February issue.)

3. A two-sample estimate of the largest mean. KHURSHEED ALAM, Indiana University.

A two-sample procedure is considered for estimating the largest mean of $K \geqq 2$ normal populations with a common unknown variance. If the total sample size is fixed equal to n, say, we take m observations from each of the K populations in the first experiment and the remaining $n - mK$ observations in the second experiment from the population corresponding to the largest sample mean observed in the first experiment. The sample mean of this population is the estimate of the largest mean. The problem is to determine a proper choice of the value of m representing the distribution of the total sample size between the two experiments. With squared error divided by the common variance as the loss function a minimax value of m is given by $U_2 = .645$ and $U_3 = .68$, approximately where $U_K = m/(n - mK + m)$, the suffix of U representing the number of populations considered. Admissibility of the above estimate and the sampling rule is also discussed.

4. On the large sample properties of a generalized Wilcoxon-Mann-Whitney statistic (preliminary report). A. P. BASU, University of Minnesota.

Let there be two samples $X_1, \cdots, X_m$ and $Y_1, Y_2, \cdots, Y_n$ $(N = m + n)$ from two populations with continuous cdf's $F(x)$ and $G(y)$. Let the first i ordered observations (out of the N combined observations) contain m_i x's and n_i y's $(m_i + n_i = i)$ where m_i and n_i are random numbers. Then to test the H_0: $F = G$ against the alternative that they are different, Sobel [Technical Report No. 69, University of Minnesota, (1965)] has proposed the statistic $V_r^{m,n} = \sum_{i=1}^{r} (nm_i - mn_i)$ based on the first r ordered observations only. In this paper the large sample properties of $V_r^{m,n}$ have been studied. The statistic is shown to be asymptotically normally distributed in the null and the non-null case, and is consistent. An expression for its efficacy is derived. Finally the test is compared with other tests proposed for life testing. K sample extensions of the problem are also considered.

5. Distribution-free independence tests. C. B. BELL and K. A. DOKSUM, Université de Paris. (By title)

Let G be the direct product with itself of the power group of the group of 1-1 strictly increasing continuous transformations of R_1 onto R_1; S, the direct product with itself of the permutation group of n elements; and $(x_1, y_1), \cdots, (x_n, y_n)$ be written $z = (x_1, \cdots, x_n; y_1, \cdots, y_n)$. The $(n!)^2$ images $S(z)$ for a.e. z in R_{2n} constitute the z-orbit; and v is a B-Pitman function if it assumes $(n!)^2$ distinct values on a.e. orbit. $T(v(z)) = \sum \epsilon \{v(z) - v(\gamma(z))\}$, for summation over S, is a B-Pitman statistic; and a statistic V is DF(SDF) if its distribution is invariant over H_0 (over the G-equivalence classes of $H_0 \cup H_1$). (A) (i) Each DF statistic has a discrete distribution with its probabilities multiples of $(n!)^{-2}$. (ii) There exists a DF statistic with any preassigned discrete distribution whose probabilities are multiples of $(n!)^{-2}$. (iii) V is DF(SDF) iff V is equivalent to a function of some B-Pitman statistic (non-sequential rank statistic). (B) For a "mildly regular" parametric alternative family $h(\theta, z)$ (i) the MP-DF statistic is given by Lehmann-Stein (1949), (ii) the locally MP-DF statistic is a B-Pitman statistic with $v = (\partial^r/\partial\theta^r)h \mid (\theta = 0)$ where