ABSTRACTS OF PAPERS

(Abstracts of papers presented at the Western Regional meeting, Berkeley, California, July 19–21, 1965. Additional abstracts appeared in earlier issues and others will appear in the October issue.)

5. Selection From Multivariate Normal Populations. KHURSHEED ALAM and M. HASAEEB RIZVI, Indian University and Ohio State University. (By title)

Two problems of selection are considered; Problem I concerns selection of t largest (that is, with largest parameter) of k populations and Problem II concerns selection of a subset containing the t largest. Procedures R_1 and R_2 respectively for Problems I and II are given. R_1 selects the t largest populations corresponding to t largest x_i's, x_i being a statistic form ith population π_i. R_2 selects a subset such that π_i is retained in the subset iff $d(x_i, x_{[k-t+1]}) \leqq \epsilon$, where $\epsilon > 0$ and $x_{[i]}$ denotes the ith smallest x_i and d is a metric; two metrics $d_1(y, z) = z - y$ and $d_2(y, z) = z/y$ are considered. The probability of a correct selection is required to be no less than P^*, $1/\binom{k}{t} < P^* < 1$, for both the problems. This P^* condition determines the common sample size for R_1 and the constant ϵ for R_2. Some operating characteristics of these procedures for a "monotone class" of populations are shown. Application of R_1 and R_2 to multivariate normal populations $\pi_i:N(\mu_i, \sum_i)$, $i = 1, \cdots, k$, is given when populations are ranked according to $\theta_i = \boldsymbol{\mu}_i' \sum_i^{-1} \boldsymbol{\mu}_i$; both cases of known or unknown $\sum_i$ are treated. Parametric subspaces where the P^* condition is satisfied are exhibited. Upper bounds for expected size of the selected subset are obtained when $t = 1$.

6. A New Proof of Some Results of Rényi. MIKLÓS CSÖRGŐ, Princeton University.

In his paper, "On the theory of order statistics," *Acta Math. Acad. Sci. Hungar.* **4** (1953), 191–231, Rényi divides the usual Kolmogorov-Smirnov statistics by $F(x)$, the continuous distribution function of the population from which one assumes having a random sample, and derives their limit distributions by reducing the respective Markov processes to additive Markov processes. In this paper, using the ideas of Doob and Donsker, it is shown that, in the limit, Rényi's random variables can be replaced by a specific Brownian movement process, and this way his original theorems are proved.

7. Characterization Theorems of the Weibull and the Weibull-Gamma Distributions. SATYA D. DUBEY, Procter and Gamble Co. (By title)

Let $X_1, X_2, \cdots, X_n$ be n independent identically distributed random variables and let $Y_n = \min(X_1, X_2, \cdots, X_n)$. Then we obtain the following characterization theorems. THEOREM 1. *If each X_i has the* Weibull *distribution with the parameters α, β and γ, then Y_n obeys the* Weibull *law with the parameters α, $n^{-1}\beta$ and γ. Conversely, if Y_n has the* Weibull *distribution with the parameters μ, σ and λ, then each X_i obeys the* Weibull *law with the parameters μ, $n\sigma$ and λ.* COROLLARY 1. *Theorem* 1 *is valid for the exponential distribution also.* THEOREM 2. *If each X_i has the* Weibull-Gamma (W-G) *distribution with the parameters α, γ, δ and η, then Y_n obeys the* W-G *law with the parameters α, γ, $n\delta$ and η. Conversely, if Y_n has the* W-G *distribution with the parameters μ, λ, θ and σ, then each X_i obeys the* W-G *law with the parameters μ, λ, $n^{-1}\theta$ and σ.* COROLLARY 2. *Theorem* 2 *is also valid for the* Lomax *(Exponential-Gamma) and the* Burr *distributions.*