ABSTRACTS OF PAPERS

(*Abstract of a paper presented at the Washington, D.C., Annual Meeting of the Institute, December 27–30, 1959.*)

76. Moment Generating Functions of Quadratic Forms of Normal Order Statistics. HAROLD RUBEN, Columbia University.

A general method is derived for obtaining the joint moment generating functions of an arbitrary set of quadratic functions, not necessarily definite positive, of order statistics in normal samples. This class of functions probably includes all or most functions of order statistics likely to be of practical interest, e.g., squared linear functions used in censored samples and other applications, squared range, squared subrange, squared deviation of extremes from the sample mean, etc. The determination of the generating functions reduces to the classic problem of the evaluation of the contents of hyperspherical simplices (the generalization of the circular arc and spherical triangle).

(*Abstracts of papers presented at the Lafayette, Indiana Meeting of the Institute, April 7–9, 1960.*)

1. Note on Significances of Differences for Attributes. IRVING W. BURR, Purdue University.

Assuming equal sample sizes and either a Poisson or binomial population, the maximum likelihood estimate of the parameter is used. Then the exact probability of a difference in "defects" or "defectives" at least as large as was observed is obtained by double summation. This probability then gives the exact significance levels for various differences and sample sizes. A table gives these results up till when the normal curve approximation takes over accurately. A quick and accurate approximation for unequal samples is indicated.

2. A Characterization of Some Location and Scale Parameter Families. SUDHISH G. GHURYE, Northwestern University. (By title)

Zinger (*Vestnik. Leningrad. Univ.*, Vol. 1 (1956), pp. 53–56) has proved the following result: Let $X_1, \cdots, X_n$, $n \geqq 6$, be independent random variables having a common distribution, which is of continuous type: let $t(X) = (1/n)\Sigma X_i$, $s(X) = [\Sigma X_i^2 - nt^2(X)]^{\frac{1}{2}}$ and $Y_i = [X_i - t(X)]/s(X)$. If the Y_i are distributed uniformly on the $(n\text{-}2)$-dimensional sphere $\{\Sigma y_i = 0, \Sigma y_i^2 = 1\}$, then the X-distribution is normal. I extend this result in an obvious way to characterize the exponential and rectangular distributions, and also the multi-variate normal and Wishart distributions. The following result is proved incidentally: Let $f(x)$ be a measurable function of real x, having the property that $x + y + z = a + b + c$ and $x^2 + y^2 + z^2 = a^2 + b^2 + c^2$ imply $f(x)f(y)f(z) = f(a)f(b)f(c)$. If $f(x) \neq 0$ for two values of x, then there exist numbers α, β, γ such that $f(x) = \alpha \exp(\beta x + \gamma x^2)$ for all x.

3. A New Class of Sequential Decision Rules for Symmetric Problems. WILLIAM JACKSON HALL, University of North Carolina. (By title)

A class of sequential tests is derived for choosing between two symmetric hypotheses with equal preassigned error probabilities. The class includes the Wald sequential probability ratio test (SPRT) and numerous other sequential tests. For a number of problems—