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ABSTRACTS

(*Abstracts of papers presented at the European Regional meeting, Hanover, West Germany, August 19–26, 1970.*)

127-4. The distributions of the sample mean and sample variance for a random sample from a mixture of two normal distributions. JAVAD BEHBOODIAN, Pahlavi University.

Let $X_1, X_2, \cdots, X_n$ be a random sample from a mixture of two normal distributions $N(\mu_1, {\sigma_1}^2)$ and $N(\mu_2, {\sigma_2}^2)$ with the mixing proportions p and $q = 1-p$. In this note we study the distributions of two statistics $\bar{X} = \sum_1^n X_i/n$ and $S^2 = \sum_1^n (X_i - \bar{X})^2/n$. It is shown that the distribution of $\bar{X}$ is a mixture of $n+1$ normal distributions, where the mixing proportions form a binomial probability function $B(n,p)$, and the distribution of $nS^2/{\sigma_1}^2$, for ${\sigma_1}^2 \leqq {\sigma_2}^2$, is a mixture of a sequence of chi-square distributions. In the particular case when ${\sigma_1}^2 = {\sigma_2}^2 = \sigma^2$ the distribution of nS^2/σ^2 is a mixture of a central chi-square distribution with $n-1$ degrees of freedom and a non-central chi-square distribution with $n-1$ degrees of freedom and non-centrality parameter $|\mu_1 - \mu_2|$, where the mixing proportions are $p^n + q^n$ and $1 - p^n - q^n$. (Received June 3, 1970.)

127-5. A sequential test for shift. PAUL SWITZER, Stanford University.

When two populations must be sampled at different times, we cannot test for shift using the standard SPRT based on paired observations. However, it is still meaningful to obtain the later sample sequentially. A test for shift with one sample-size fixed and the other sample-size random is proposed, some of its properties are developed under normal theory assumptions, and a comparison is made with the completely fixed sample-size procedure. (Received June 9, 1970.)

127-6. Test about the maximum parameter and the superiority of the best population (preliminary report). T. CACOULLOS, University of Athens.

Consider k ($k \geqq 2$) populations of the same parametric family of distributions. The distribution has specified form and involves an unknown scale parameter θ. Let $\theta_{[1]} \leqq \theta_{[2]} \leqq \cdots \leqq \theta_{[k]}$ be the ordered parameters of the k populations. Fixed-sample tests about $\theta_{[k]}$ are considered. In each case (e.g., normal means or variances) the test is based on the statistics (usually sufficient statistics for θ) used in the corresponding problem of selecting the best population (associated with $\theta_{[k]}$) in the well-known Bechhofer–Sobel formulation of the ranking problems. Under the same assumptions tests about the superiority $\delta = \theta_{[k]} - \theta_{[k-1]}$ (when θ is a location parameter) or $\lambda = \theta_{[k]}/\theta_{[k-1]}$ (when θ is a scale parameter) are also examined. The relevance of these tests to ranking procedures is obvious. (Received June 23, 1970.)

127-7. A class of estimates of location parameter after a preliminary test on regression. A. K. MD. EHANSES SALEH, Carleton University.

In a recent paper Hodges and Lehmann (1963, AMS) proposed a general method of obtaining robust point estimates of location parameter based on rank tests. Adichi (1967, AMS) extends this method to the re-regression model $F(y - \alpha - \beta x_j)$, $j = 1, 2, \cdots, n$ where x_j's satisfy Noether conditions (Hájek (1962)) and defines suitable estimates of α and β which possess excellent properties such as invariance, symmetry of distribution of the estimates asymptotic normality and Pitman's efficiency. In this paper we propose a class of estimates of α when the regression β is doubtful. Under this situation we test on the hypothesis $\beta = 0$ against $\beta > 0$ using Hájek's (1962) statistic and the estimates of α are based on the result of the test. The estimates are shown to be invariant under each condition of the hypothesis and possess nonsymmetric continuous distribution. Hence, the asymptotic "bias" and mean-square error expression of the estimates are obtained.