ABSTRACTS OF PAPERS

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

15. The estimation of the parameters of a mixture of distributions. MIR M. ALI and A. B. M. LUTFUL KABIR, University of Western Ontario.

In this paper a general method of constructing estimators for the parameters of a mixture of a finite number of distributions has been developed. The method is applicable to a finite mixture of each of the following distributions: binomial, Poisson, negative binomial, logarithmic series, geometric, exponential, normal and Weibull. The special case of a mixture of two binomial distributions has been studied at length. To this end, two different sets of estimators for the three parameters have been constructed. The estimators are shown to be consistent and asymptotically normally distributed. The expressions for the asymptotic covariance matrices are also derived explicitly. Finally, tables are prepared furnishing the asymptotic efficiencies of the estimators.

16. Inadmissibility of the classical estimator of the multiple regression function. A. J. BARANCHIK, Columbia University. (By title)

Let $Z_1, \cdots, Z_n$ be a sample of size n from $Z = (Y, X_1, \cdots, X_p)'$, a $(p + 1)$-dimensional multivariate normal random variable. Writing the regression function as $E(Y \mid X) = a + b'X$ it is shown that, for $p \geqq 3$, the classical estimator $\hat{a} + \hat{b}'X$ has everywhere greater risk (for the loss function given by C. Stein in *Multiple Regression*. Contributions to Prob. and Stat., Stanford Univ. Press, 1960) than $\tilde{a} + \tilde{b}'X$, where $(\hat{a}, \hat{b})$ is the maximum likelihood estimator of (a, b), $\tilde{a} = \bar{Y} - [1 - c(1 - R^2)/R^2]\hat{b}'\bar{X}$, $\tilde{b} = [1 - c(1 - R^2)/R^2]\hat{b}$, R is the sample correlation coefficient, and $0 < c < 2(p - 2)/(n - p + 2)$.

17. An optimization problem in quality control. EBERHARD BAUR, Aerojet-General Corporation.

In industry management often faces the problem to optimize quality control procedures with respect to test expenses, discrepencies, and fixed obligations to the customer. This paper discusses the case where the customer requires the mean values of production runs to exceed not a given value with given significance. The producer controls with samples drawn from the runs, and he may use fixed sample size procedures or sequential testing. Introducing the distribution function of the true means as a parameter, mathematical formulations are discussed which relate sample size of the quality control procedure and discrepancy. The variance of the distribution under test is assumed to be known. For the application by sequential testing, Wald's test for the mean of a normal population with known variance is used. Some considerations are given to a comparison between the fixed sample size and the sequential procedure; this will involve several parameters as the error of the first kind and the average sample size of the sequential test, and the fraction to accept the null hypothesis. Knowing all the relations between sample size and discrepancy the producer can balance the involved costs for a maximum profit.