ABSTRACTS OF PAPERS

(Abstracts of papers to be presented at the Annual meeting, Washington, D. C., December 27–30, 1967. Additional abstracts appeared in the June, August and October issues and will appear in the February issue.)

9. Optimally robust linear estimators of location. Allan Birnbaum and Eugene M. Laska, Courant Institute of Mathematical Sciences, New York University, and Rockland State Hospital.

The approach to optimal efficiency-robust estimation outlined in Birnbaum (these abstracts, **32** (1961): 622), and developed in "A General Theory of Robustness", E. Laska ((1962), NYU Ph.D. thesis), is applied to determine admissible and maximin-efficient linear unbiased estimators (ALUEs and MLUEs) of location, and their efficiencies, for ordered samples of sizes 5, 10, 15, and 20, from the normal, logistic, double exponential, Cauchy, long-tailed (Tukey), and rectangular distributions. It is shown that the results and interpretations may be summarized relatively compactly because of the striking tendency of these distributions to admit a simple ordering such that the MLUE over any subset of the distributions is just the MLUE over the extreme pair of distributions in the ordered subset. MLUEs based (a) on uniformly spaced sample quantiles, and (b) on optimally spaced sample quantiles, are determined and compared with those based on complete samples. Relations to other methods and results are discussed. Extended tables of moments of order statistics of Tukey's long-tailed distribution, computer for this investigation, are given. (Received 28 August 1967.)

10. Asymptotic distribution of the sample size for a sequential probability ratio test. K. C. Chanda, University of Florida.

Let $X_1, X_2, \cdots$ be a sequence of mutually independent and identically distributed random variables with a common pdf $f_\theta(x)$ (wrt a measure $\mu(x)$). Consider the standard sequential probability ratio test (SPRT) for $H: \theta = \theta_0$ against the alternative $K: \theta = \theta_1$. Let $\Delta = \theta_1 - \theta_0 > 0$, and let n denote the number of observations required to complete the SPRT. Then we accept H if $\sum_{j=1}^n Z_j \leqq \log B$ and reject H if $\sum_{j=1}^n Z_j \geqq \log A$, where $Z_j = \log f_{\theta_1}(x_j) - \log f_{\theta_0}(X_j)$. Write $\log A = a$, $\log B = b$, $\mu = E_\theta(Z_1)$, $\sigma^2 = V_\theta(Z_1)$ and assume that a and b are finite preassigned quantities with $b < 0 < a$. Further let $\mu/\Delta \neq 0$. Then it is proved, under some mild regularity conditions, that as $\Delta \to 0$, the following results hold: (i) If $\mu/\Delta > 0$ then the distribution of $n^* = (n - a/\mu)/c_1$ where $c_1 = \sigma(a/\mu^3)^{\frac{1}{2}}$, tends to $N(0, 1)$. (ii) If $\mu/\Delta < 0$, the distribution of $n^{**} = (n - b/\mu)/c_2$ where $c_2 = (b/\mu^3)^{\frac{1}{2}}$, tends to $N(0, 1)$. (Received 7 August 1967.)

11. The two-armed bandit problem with finite memory. Thomas M. Cover, Stanford University.

Robbins has proposed a finite memory constraint on the two-armed bandit problem in which the coin to be tossed at each stage may depend on the history of the previous tosses only through the outcomes of the last r tosses. Letting the choice of coin depend on the time at which the toss is made, we exhibit a deterministic rule with memory $r = 2$, the description of which is independent of the coin biases p_1 and p_2, which achieves, with probability one, a limiting proportion of heads equal to $\max\{p_1, p_2\}$. Thus, this rule is asymptotically uniformly best among the class of time-varying finite memory rules. (Received 28 August 1967.)