ABSTRACTS

(Abstracts of papers presented at the Central Regional meeting, Columbus, Ohio, March 23–25, 1967. Additional abstracts appeared in the February and April issues.)

14. Selecting a subset containing the best hypergeometric population. N. S. Bartlett and Z. Govindarajulu, The Standard Oil Company and Case Institute of Technology.

In many practical situations, such as in acceptance testing, an experimenter is faced with finite populations and finds it necessary or desirable to sample the populations without replacement. The parameter of interest may be p, the proportion of 'good' items, and the experimenter may wish to choose a subset of the k (hypergeometric) populations which will contain the best population (the one with the largest p-value) with specified probability. A selection rule for this situation is specified and its small-sample properties are studied. Tables are provided to facilitate the use of the procedure. A large sample procedure is also studied. (Received 6 February 1967.)

15. Nonparametric tests for 2-factor experiments (preliminary report). C. B. Bell and H. Geller, Case Institute of Technology.

For the case of one observation per cell the hypothesis "no column effect" can be stated $H_0 : F_{ij} = \bar{F}_{i\cdot}$ for $i = 1, 2, \cdots, r$ (where the F_{ij} are continuous). Using the ideas of Pitman [(1937), (1938)], Scheffé (1943), Lehmann and Stein (1949) and Bell and Doksum (1967) one proves: Theorem 1. *Each NP statistic is a function of a permutation statistic* wrt *to the appropriate permutation group* $\mathcal{S}'$. Theorem 2. *Each similar test function has a constant sum over* a.e. *orbit under* $\mathcal{S}'$. Theorem 3. *For non-sequential statistics, a statistic is a rank statistic iff it is* SDF wrt *the appropriate group* $\mathcal{G}$ *of monotone transformations.* Theorem 4. *The most powerful* NP *test against a parametric alternative is based on the permutation statistic of the likelihood function.* (Received 3 February 1967.)

16. Bivariate symmetry tests: parametric and NP (preliminary report). C. B. Bell and H. Smith Haller, Case Institute of Technology.

$H_0 : F(x, y) = F(y, x)$ in the normal case reduces to $H_0' : M_1 = M_2$ and $\sigma_1 = \sigma_2$. (A) A 45° rotation yields: reject H_0' if $|\bar{r}(1 - \bar{r}^2)^{-\frac{1}{2}}(n-2)^{\frac{1}{2}}| > t(\alpha_1, n-2)$ or $|\bar{v}n^{\frac{1}{2}}s_v^{-1}| > t(\alpha_2 n - 1)$ where $u = x + y$, $v = x - y$ and $\bar{r} = r(u, v)$. (B) The likelihood ratio test is based on $(1 - \bar{r}^2)(n-1)[n - 1 - n\bar{v}^2/s_v^2]^{-1}$. For the NP case, (C) the family of all NP statistics is the family of all functions of Pitman statistics and (D) the most powerful NP tests against a specific parametric alternative is based on permutations of the likelihood function. Further, (E) the procedure in (D) can be reversed; and one finds, for example, for normals the Pitman statistics of (i) $\bar{x} - \bar{y}$ is "best" when $\sigma_1 = \sigma_2$, and (ii) $\sum x_r^2 - \sum y_r^2 - 2n\mu(\bar{x} - \bar{y})$ is "best" when $M_1 = M_2 = \mu$. (Received 3 February 1967.)

17. Nonparametric randomness tests. C. B. Bell and E. F. Mednik, Case Institute of Technology.

For the randomness hypothesis $H_0 : F_1 = F_2 = \cdots = F_n$, one finds: Theorem 1. *Each* NP *statistic has a discrete H_0-distribution with probabilities integral multiples of* $(n!)^{-1}$, *and is a function of a permutation statistic. Further, for each discrete distribution F with*

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