ABSTRACTS OF PAPERS

(Abstract of a paper presented at the Central Regional Meeting, Manhattan, Kansas, May 7–9, 1964. Additional abstracts appeared in the June issue.)

22. **On the Construction of a Class of Optimum Balanced Factorial Fractions by Linear Integer Programming.** J. N. SRIVASTAVA, University of Nebraska.

In this paper the construction of a class of balanced fractions for $(2^n \times 3^m)$ $(n \geqq 0, m \geqq 0)$ factorials which would permit the estimation of all the main effects and two factor interactions has been considered. For any fixed m and n, different criteria for calling a fraction "optimum" could be laid down, e.g. $|\Sigma|$, trace Σ, or largest root of Σ $(\overset{\text{ch}}{\max}\ \Sigma)$. The merits of these have been compared, and the last one is selected. Finally it has been shown how the problem of construction of a balanced fraction with a minimum number of assemblies, and for which $(\overset{\text{ch}}{\max}\ \Sigma) < c$ (a constant > 0), could be reduced to a problem in linear integer programming. This has been achieved by using the properties of the association schemes arising in factorial designs, as discussed by Bose and Srivastava in University of North Carolina, Institute of Statistics, mimeo series numbers 373 and 376.

(Abstracts of papers presented at the Annual Meeting, Amherst, Massachusetts, August 26–29, 1964. Additional abstracts appeared in earlier issues and others will appear in the December issue.)

8. **Missing Values in Multiple Regression.** A. AFIFI and R. M. ELASHOFF, University of California, Berkeley.

We propose, survey and evaluate probabilistically several estimation methods for the unknown parameters in a multiple regression when some of the observations on the independent and dependent variables are missing. Point and interval estimation are considered, univariate and multivariate predictands are taken up, Bayesian and non-Bayesian techniques are used. Simple recommendations as to the preferred method of estimation in particular instances are given by tabular presentations. Our work quantifies and spells out in detail the widely held view of data analysts that classical least squares estimation should not be used when the number of vector observations with at least one component missing is large.

9. **Conditional Expectation Given a σ-Lattice, and Applications.** H. D. BRUNK, University of Missouri. (Invited).

In the past ten years a number of writers have studied problems whose solutions may be expressed as conditional expectations given σ-lattices [Brunk, *Proc. Amer. Math. Soc.* **14** (1963) 298–304]. Many properties of conditional expectation given a σ-field carry over, including, for example, mean-square and almost sure convergence of (generalized) martingales. Applications discussed are of two kinds; in each the solution of a problem posed is the conditional expectation of a given function on a finite set, given a prescribed sub-σ-lattice of the class of all subsets. In problems of the first type, observed values are given of random variables whose joint distribution depends on an unknown function on a prescribed space, given to be measurable with respect to a prescribed σ-lattice. In problems of the second type, a measure space $(T, \mathcal{B}, \nu)$ is given, and observations are made on T