ABSTRACTS

(*Abstracts of papers presented at the Annual meeting, New Brunswick, New Jersey, August 30–September 2, 1966. Additional abstracts appeared in earlier issues.*)

50. Multidimensional partially balanced designs. Donald A. Anderson, University of Nebraska. (By title)

The construction and analysis of three and four dimensional designs have been discussed by Potoff [*Technometrics* (1962)]. J. N. Srivastava [*Sankhyā* (1964)] has defined a multidimensional partially balanced, MDPB, association scheme and has introduced a class of multidimensional partially balanced designs. A general procedure for the analysis of MDPB designs is given by Srivastava; however, the construction of such designs was not studied. Consider the following 6 sets, for a cube take S_1, the set of edges; S_2, the set of verticies; S_3, the set of faces; S_4, the set of lines joining the midpoints of diagonally opposite edges; S_5, the set of diagonals; and S_6, the set of lines joining the midpoints of opposite faces. Let C be the class of $m = \sum_{k=1}^{6} m_k$ sets consisting of the above 6 sets where the kth set is included in the class m_k times. A MDPB association scheme has been defined on C and several three and four dimensional designs have been constructed which involve a very small fraction of a full replication. MDPB association schemes which are extensions of ordinary triangular and cyclic schemes have been defined for other classes of sets and MDPB designs corresponding to these schemes have been constructed. (Received 18 July 1966.)

51. On the non-existence of some partially balanced arrays with 2 symbols (preliminary report). Dharam Vir Chopra, University of Nebraska. (By title)

A partially balanced array of strength d, m constraints, N assemblies, 2 symbols [see Chakravarty "Fractional replications in asymmetrical factorial designs and partially balanced arrays," *Sankhyā* **17** (1956)] is an $(m \times N)$ matrix T with elements 0 and 1, with the following property: Let T^* be any d-rowed submatrix of T and let $\mathbf{v}_1 = (j_{11}, j_{12}, \cdots, j_{1d})'$, $\mathbf{v}_2 = (j_{21}, \cdots, j_{2d})'$ be any two column vectors of T^* where the j's $= 0$ or 1 and $\mathbf{v}_1$ is obtainable from $\mathbf{v}_2$ by permuting its elements. Then $\lambda(\mathbf{v}_1) = \lambda(\mathbf{v}_2)$ where $\lambda(\mathbf{v}_i)$ is the number of times $\mathbf{v}_i$ occurs as a column in T^*. Let μ_i be the number of times each distinct column vector of weight i appears in T^*, and put $\boldsymbol{\mu}' = (\mu_0, \mu_1, \mu_2, \cdots, \mu_d)$. In the paper "Optimal balanced 2^m fractional factorial designs" (to be published in S. N. Roy memorial volume, Univ. of North Carolina), J. N. Srivastava shows that an array S with parameters $m = 7, N = 44, d = 4$ and $\boldsymbol{\mu}' = (4, 3, 2, 3, 4)$, considered as a fractional design for 2^7 factorial, minimizes the trace of the covariance matrix of the estimates (among the class of all PB array with $N = 44$). He obtains S by taking all 7-place column vectors, with weights 0, 2, 5 and 7. In this paper the array S has been shown to be unique. As a consequence of this the non-existence of arrays with parameters $N = 44$, $m = 8$, $d = 4$ and values of $\boldsymbol{\mu}$ equal to (4, 3, 2, 3, 4), (3, 3, 2, 3, 5), (1, 3, 3, 3, 1), (5, 2, 3, 2, 5), (7, 2, 3, 2, 3) and (6, 2, 2, 4, 2) has been established. (Received 18 July 1966.)

52. Sequential selection of the best of k population. John Deely, Purdue University.

Let $\pi_1, \pi_2, \cdots, \pi_k$ be k populations and let $w = (\theta_1, \theta_2, \cdots \theta_k)$ be the vector of unknown parameters. We assume the ordering to be random permutation so that even if the