THE PENNSYLVANIA STATE UNIVERSITY
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Computation Center

1. A lattice square program for the I.B.M. 650.

The lattice square statistical design is used extensively in field experiments of the corn breeding program of the Agronomy Department, The Pennsylvania State University. A program has been written to automatically compute the analysis of variance using an I.B.M. 650 System with I.A.S. and indexing registers.

Following the notation of the textbook, Experimental Designs, by Cochran and Cox, the program was written for a design with k^2 treatments per replication with $(k+1)/2$ or less replications. The program has a capacity for k as large as 11 and 13 with 6 and 3 replications, respectively. The data cards contain identification for experiment, entry, replicate, row and column with values for up to seven variables. Each observation may have as many as eight digits.

The program reads a parameter card which defines k and r and the variable to be analyzed. Data cards (in any order) are read and processed following the parameter card. The data are left justified automatically to give maximum precision and computation is performed in double precision fixed point arithmetic. A transfer card sends control to a checking routine which determines if all items of data have been entered properly and if so the analysis is completed. In case of errors or omissions, two cards are punched indicating the location in the design of errors or omissions and control is sent to begin a new analysis.

Means and totals for entries adjusted for row and column effects are punched. A console option allows for additional punching of the same unadjusted information.

The analysis of variance output includes sums of squares, degrees of freedom and mean squares for total, replication, unadjusted and adjusted treatment, row, column and residual error. The correct effective error mean square and degrees of freedom are also computed and punched considering the presence or absence of row and/or column effects.

Input, computation and output times required for the analysis of a 5 x 5 and an 8 x 8 lattice square with 3 replicates are 45 and 90 seconds, respectively.

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