



DECUS

PROGRAM LIBRARY

DECUS NO.	FOCAL8-193
TITLE	ANOVA, 2-WAY, UNSYMMETRICAL
AUTHOR	Lars Palmer
COMPANY	AB Hassle Goteborg, Sweden
DATE	June 15, 1971
SOURCE LANGUAGE	FOCAL '69

ATTENTION

This is a USER program. Other than requiring that it conform to submittal and review standards, no quality control has been imposed upon this program by DECUS.

The DECUS Program Library is a clearing house only; it does not generate or test programs. No warranty, express or implied, is made by the contributor, Digital Equipment Computer Users Society or Digital Equipment Corporation as to the accuracy or functioning of the program or related material, and no responsibility is assumed by these parties in connection therewith.

ANOVA, 2-WAY, UNSYMMETRICAL

DECUS Program Library Write-up

DECUS NO. FOCAL8-193

ABSTRACT

This is an analysis of variance program (Anova) for the two-way classification table. It is a general method to analyze two-way classifications which gives the analysis of variance table and calculated row and column factors for unequal groups and for missing groups.

1. Load the program tape with 8K FOCAL. If loading is from HSR the tape stops. If the data is to be input from HSR read in the remainder of the program. If you do not use a HSR stop program input before the last part of the tape.

Type G on the teletype and press the return key.

2. In answer to the machine questions input the number of rows and the number of columns in your matrix (note that the calculation time will be shorter if the number of columns is smaller than the number of rows). For each group input first the number of observations per group and then the values of the observations. The groups are input in such a way that the column number changes faster than the row number i.e., first input column 1, 2, 3 of row 1, then the same for row 2 and so on until the last value.

Input from HSR is in the same format.

3. After the last value has been input the teletype prints:

a. The preliminary anova giving the main effects and the F value for variations between groups. If this is not significant so should the calculations be halted here.

b. The machine then gives the column factors, the grand mean, the row factors and the adjusted means as calculated from the linear equations.

c. Finally the machine prints the final anova giving the adjusted column and row factors, the interaction and S, which are the same as for the preliminary anova.

If the interaction is significant the rest of the material should be ignored.

DESCRIPTION

Because of the limited storage capacities of FOCAL it has been necessary to make a compromise between storage and the use of running sums. The individual observations are not stored, however it is necessary to store the number of observations per group and the sum of these observations.

Principle of the least square analysis

The details of the analysis cannot be included here. The user is advised to read chapter 12.17 in (1).

The program first calculates the normal two-way analysis of variance without interaction effect. The normal equations for the A and B are then set up and solved (the solving of the normal equations is done according to program FOCAL8-15). The row and column values are calculated and the analysis of variance is completed according to the reference.

OUTPUT

The output consists of the two analysis of variance tables. The program also outputs the column factors, the row factors i.e., the A:s and B:s in equation and the adjusted means. It should be noted that these adjusted means are the best estimate of the means of the group using the suggested model for the material.

PROGRAM

The program uses a large number of locations for storage of the running sums necessary for the calculations. The explanations of the names of these locations can be found in table 1.

LIMITATIONS

The matrix for solving of linear equations is indexed in such a way that the largest column number that can be accommodated is ten and any attempt to run the program with more than ten columns will give unpredictable results. The maximal number of rows is dependent on number of columns e.g., at 5 columns the maximal is 20 rows with the extended functions gone.

References (1)

Statistical Methods Vth edition. G. Snedecor, Iowa State University Press, 1956

Note that the VIth edition uses a slightly different notation for the equations.

TABLE 1

VARIABLE	DEF IN LINE	USED FOR	DIMENSION
R O	1.1	Rows	1
C O	1.1	Columns	1
I	1.2	Working	1
S	9.1	$\bar{Z} X$	1
S S	9.1	$\bar{Z} X^2$	1
K	9.1	Working	1
N (K)	9.2	Number in group K	R O x C O
L	9.22	Working	1
X	9.01	Working	1
X C (J)	9.25	\bar{Z} incol	C O
N C (J)	9.25	N incol	C O
X R (J)	9.3	\bar{Z} in row	R O
N R (J)	9.3	N in row	R O
X T	9.4	Tot \bar{Z}	1
N T	9.4	Tot N	1
Q G	9.5	\bar{Z} groups ²	1
Q T	9.5	\bar{Z} Tot ²	1
Q	9.9	Missing groups	1
Q R	1.2	\bar{Z} row ²	1
Q C	1.3	" col ²	1
C T	1.4	corr term	1
Z	1.4	M S Error	1
B	4.1	Temp	1
A (J)	4.4	X values in sim eg	C O x C O
B (I)	3.2	Y " " " "	C O
M	21.1	Temp	1
X (I)	20.2	Sol to eq	C O
N	2.01	Dim of eq system	1
T A	2.01	Temp	1

VARIABLE	DEF IN LINE	USED FOR	DIMENSION
L F	2.02	Linefeed	1
S X	2.04	Sum X	1
D	2.14	DF int	1
Y	2.75	Red due to const	1

