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DECUS NO. FOCAL8-108

TITLE ANALYSIS OF VARIANCE FOR TWO-DIMENSIONAL MATERIAL

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DATE May 13, 1970

SOURCE LANGUAGE FOCAL

ANALYSIS OF VARIANCE FOR TWO-DIMENSIONAL MATERIAL

DECUS Program Library Write-up

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ABSTRACT

This is an analysis of variance program written in FOCAL to be used on material arranged in a two-sided table containing R by C-groups. There are actually two programs described in the table below.

Program	Size of Material	Means and SEM
A	R C maximum	
	20	Yes
B	C max 10	No
	R unlimited	

The two programs differ in capacity of the size of the input matrix and in whether the means and standard errors of the different cells are produced or not.

OUTPUT

For program B: A table over the means and standard error of means of all groups, rows, columns and of the total material.

In both programs: the analysis of variance table in standard format for a two-dimensional analysis of variance. Computing method is the standard method for 2-dimensional analysis of variance.

INPUT

a. The number of columns and rows in the matrix.

b. The number of observations per group (note that the number of observations must be the same in all groups) followed by

c. The observations columnwise.

When all the material has been entered the program prints the output. For program A the machine gives the mean and standard error of mean for each group printing out row number and column number for the group. After each row it gives the mean and standard errors of

the row, and after the whole material has been gone through in this way, it gives the means, and standard errors for the columns and then for the total.

In program B analysis of variance table is printed with the proper designations given. In program A, to conserve storage space, the table is written in a compact shorthand way. The actual format of the table is as given in the figure below.

SOURCE	Sum of squares	Degrees of freedom	Mean square	F value
Between rows				
Between columns				
Interaction				
Subtotal				
Within groups				
Total				

Comment

Program B. The actual maximal size of the program has not been determined. It can be run with ten columns and 45 rows. If anyone finds the maximum test sections the author would be pleased to have information about it.

A

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Ø1.Ø5   E
Ø1 1Ø   A   ?KO,RO?,!,?OB?
Ø1.2Ø   F   A=1,1,RO; T !; F B=1,1,KO; T !; D 3.Ø
Ø1.4Ø   T   !!;F A=1,1,RO,;T !,; S SR=Ø;S QR=Ø; D 5.Ø
Ø1.5Ø   T   !;F B= 1,1,KO; S SS=Ø; S SV=Ø; D 8.Ø
Ø1.6Ø   S   SS=Ø; S SV=Ø; F A=1,1,KO*RO;D 9.4
Ø1.7Ø   S   C=OB*KO*RO; T !!, "T              ";D 7.Ø
Ø1.75   T   %8.Ø4
Ø1 8Ø   S   SR=Ø; F A=1,1,RO; S X=Ø; D 1Ø.Ø
Ø1.9Ø   S   QR=Ø;F B=1,1,KO;S X=Ø; D 11.Ø

Ø2.Ø5   S   SV=Ø;S SS=Ø;S B=Ø;F A=1,1,RO*KO;D 12.Ø
Ø2.1Ø   S   SV=SV↑2/OB*RO*KO
Ø2.2Ø   S   SR=SR-SV; S QR=QR-SV;SS SS=SS-SV;
Ø2.25   S   B=B-SV;S SV=SS-B; S X=B-SR-QR
Ø2.5Ø   T   !!!!,"R",SR,RO-1,SR/(RO-1)
Ø2.55   T   RO*KO*(OB-1)*SR/SV*(RO-1),!,"K",QR,
Ø2.6Ø   T   KO-1,QR/(KO-1),RO*KO*(OB-1)*QR/SV*(KO-1),!
Ø2.7Ø   T   ,"I",,X,(KO-1)*(RO-1),X/(KO-1)*(RO-1)
Ø2.75   T   X*RO*KO*(OB-1)/(KO-1)*(RO-1)*SV,!,"S",B
Ø2 8Ø   T   ,KO*RO-1,,B/(KO*RO-1),
Ø2 85   T   B*RO*KO*(OB-1)/SV*(KO*RO-1),! ,"W
Ø2.9Ø   T   SV,KO*RO*(OB-1),SV/KO*RO*(OB-1),!
Ø2 95   T   "T",, SS,,KO*RO*OB-1,!!;Q

Ø3.Ø5   S   D=(A-1)*KO+B
Ø3 1Ø   F   C=1,1,OB;A X; S SV(D)=SV(D)+X; S SS(D)=SS(D)+X*X

Ø5.1Ø   F   B=1,1,KO; D 6.Ø
Ø5.2Ø   S   SV=SR; S SS=QR; S C=OB*KO; T !, "R",%2.ØØ,A,"          "; D 7.Ø

Ø6.1Ø   D   3.Ø5 ;S SV=SV(D); S SS=SS(D); S C=OB
Ø6.2Ø   S   SR= SR+SV; S QR=QR+SS
Ø6 3Ø   T   %2.ØØ,!, A,",",B,"     ";D 7.Ø

Ø7 1Ø   T   %8.Ø4
Ø7.3Ø   T   SV/C, FSQT((SS-SV↑2/C)/C*(C-1)),  %3.ØØ,C

Ø8 1Ø   F   A= 1,1,RO; D 9.3
Ø8.2Ø   S   C= OB*RO; T !,"K",%2.ØØ,B,"          "; D 7.Ø

Ø9 3Ø   D   3.Ø5;S SS=SS+SS(D); S SV=SV+SV(D)
Ø9 4Ø   S   SS=SS(A)+SS; S SV=SV(A)+SV

1Ø.1Ø   F   B=1,1,KO;D 3.Ø5;S X=X+SV(D);
1Ø 2Ø   S   SR=SR+X*X/OB*KO
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11.1Ø    F    A=1,1,RO;D 3.Ø5; S X=X+SV(D)
11.2Ø    S    QR=QR+X*X/OB*RO

12.1Ø    S    SV=SV+SV(A);S SS=SS+SS(A)
12.2Ø    S    B=B+SV(A) ↑2/OB
*
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B

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Ø1.Ø5    E
Ø1.1Ø    A    ?KOLUMNS ROWS?,!,?OBSERVATIONS?
Ø1.2Ø    F    A=1,1,RO;T !;D 1Ø.Ø
Ø1.3Ø    F    A=1,1,KO; S QR=QR+SK(A) ↑2/OB*RO
Ø1.4Ø    S    SV=SV ↑ 2/OB*KO*RO; S B=SB;

Ø2.2Ø    S    SR=SR-SV;  S QR=QR-SV;S SS=SS-SV;
Ø2.25    S    B=B-SV;S SV=SS-B; S X=B-SR-QR
Ø2.3Ø    T    !!!,"ANOVA
Ø2.4Ø    T    !, "SOURCE          SS          DF          MS          F
Ø2.5Ø    T    !, %8.Ø4, "ROWS        ",SR,%2.ØØ,RO-1,%8.Ø4,SR/(RO-1)
Ø2.55    T    RO*KO*(OB-1)*SR/SV*(RO-1),!,"KOLUMNS     ",QR,%2.ØØ
Ø2.6Ø    T    KO-1,%8.Ø4,QR/(KO-1),RO*KO*(OB-1)*QR/SV*(KO-1),!
Ø2.7Ø    T    "INTERACTION",X,%2.ØØ,(KO-1)*(RO-1),%8.Ø4,X/(KO-1)*(RO-1)
Ø2.75    T    X*RO*KO*(OB-1)/(KO-1)*(RO-1)*SV,!,"SUBTOTAL    ",B
Ø2.8Ø    T    %2.ØØ,KO*RO-1,%8.Ø4,B/(KO*RO-1),
Ø2.85    T    B*RO*KO*(OB-1)/SV*(KO*RO-1),! ,"WHITHIN
Ø2.9Ø    T    SV,%2.ØØ,KO*RO*(OB-1),%8.Ø4,SV/KO*RO*(OB-1),!
Ø2.95    T    "TOTAL         ",  SS,%2.ØØ,KO*RO*OB-1,!!;Q

Ø3.Ø5    S    SX=Ø; S XX=Ø
Ø3.1Ø    F    C=1,1,OB; A X; S SX=SX+X; S XX=XX+X*X
Ø3.2Ø    S    RR=RR+SX; S SK(B)=SK(B)+SX
Ø3.3Ø    S    SV=SV+SX;S SS=SS+XX
Ø3.4Ø    S    SB=SB+SX ↑2/OB

1Ø.1Ø    S    RR=Ø;F B=1,1,KO; T !; D 3.Ø
1Ø.2Ø    S    SR=SR+RR ↑ 2/OB*KO
*
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