MATRIX COFACTOR

PURPOSE

Compute the matrix cofactors of a matrix.

DESCRIPTION

If B_{ij} is the determinant of matrix A with row i and column j omitted, then the cofactor of row i and column j is $(-1)^{(i+j)}*B_{ij}$ (the B_{ij} are called the minors). Matrices for which cofactors are computed must have the same number of rows and columns. An error message is printed if they do not.

SYNTAX

LET <par> = MATRIX COFACTOR <mat> <rowid> <colid> <SUBSET/EXCEPT/FOR qualification>
where <mat> is a matrix for which a cofactor is to be computed;
<rowid> is the row of <mat1> for which a cofactor is to be computed;
<colid> is the column of <mat1> for which a cofactor is to be computed;
<par> is a parameter where the computed cofactor is saved;
and where the <SUBSET/EXCEPT/FOR qualification> is optional and rarely used in this context.

EXAMPLES

LET C = MATRIX COFACTOR A 2 3

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

MATRIX ADJOINT	=	Compute the adjoint matrix of a matrix.
MATRIX DEFINITION	=	Set a matrix definition.
MATRIX DETERMINANT	=	Compute a matrix determinant.
MATRIX MINOR	=	Compute a matrix minor.
MATRIX NUMBER OF COLUMNS	=	Compute the number of columns in a matrix.
MATRIX NUMBER OF ROWS	=	Compute the number of rows in a matrix.
MATRIX SUBMATRIX	=	Define a matrix submatrix.

REFERENCE

Any standard text on linear algebra.

APPLICATIONS

Linear Algebra

IMPLEMENTATION DATE

87/10

PROGRAM

```
DIMENSION 100 COLUMNS
READ MATRIX X
16 16 19 21 20
14 17 15 22 18
24 23 21 24 20
18 17 16 15 20
18 11 9 18 7
END OF DATA
LET NROW = SIZE X1
LET NCOL = MATRIX NUMBER OF COLUMNS X
LOOP FOR J = 1 1 NCOL
    LOOP FOR I = 1 1 NROW
        LET B = MATRIX COFACTOR X I J
        LET TEMP(I) = B
    END OF LOOP
    LET A^J = TEMP
END OF LOOP
LET A = MATRIX DEFINITION A1 NROW NCOL
PRINT A
```

The following cofactor matrix is generated:

```
         MATRIX A       --            5 ROWS
                        --            5 COLUMNS

 VARIABLES--A1             A2             A3             A4             A5

   0.6999982E+02 -0.7590000E+04  0.7170000E+04  0.1030000E+04 -0.1199995E+03
  -0.3107999E+04  0.4170002E+04 -0.6606000E+04  0.2962000E+04  0.2315999E+04
  -0.2030000E+04  0.6759999E+04  0.5420000E+04 -0.2260000E+04 -0.6560000E+04
   0.3542000E+04 -0.1529998E+04 -0.5666000E+04 -0.2098000E+04  0.5976000E+04
   0.3472000E+04 -0.3980000E+04 -0.2796000E+04  0.1892000E+04  0.1076001E+04
```