

NAME

MINR – Find the minimum-ratio row in a given column of a linear programming tableau.

SYNOPSIS

CALL MINR(T,LDT,ROWS,MR,JP, IP)

T(LDT,*) is the REAL*8 LP tableau
LDT is the INTEGER*4 leading dimension of T
ROWS(MR) is the INTEGER*4 vector of row indices in the problem
MR is the INTEGER*4 number of rows in the problem
JP is the INTEGER*4 pivot column in which the minimum ratio is to be found
IP is the INTEGER*4 index of the minimum ratio row, or 0 if no entry > 0 in column JP

DESCRIPTION

The routine begins by checking whether column JP is one of the variable columns in the tableau; if it is ≤ 1 it writes a message and stops the program. Otherwise it computes the ratio $T(\text{ROWS}(I),1)/T(\text{ROWS}(I),\text{JP})$ for each constraint row $I=2\dots\text{MR}$ and returns the index IP of the row I having the lowest positive ratio.

DIAGNOSTICS

If the pivot column is not a variable column this routine writes a message and stops the program. If IP=0 on return no element in column JP is greater than 1.D-06.

LINKAGE

gfortran source.f -L\${HOME}/lib -lmisc

AUTHOR

Michael Kupferschmid

EXAMPLE

```

PARAMETER (LDT=3,MP=3,N=5,MR=3)
INTEGER*4 ROWS (MR) /1,2,3/
INTEGER*4 BASIS (5) /0,0,0,2,3/,RC
REAL*8 T (LDT,1+N) /0.D0, 5.D0, 5.D0,
;                -2.D0, 1.D0, 0.D0,
;                1.D0,-2.D0, 1.D0,
;                -1.D0, 2.D0, 1.D0,
;                0.D0, 1.D0, 0.D0,
;                0.D0, 0.D0, 1.D0/
REAL*8 TOUT (LDT,1+N)
DO 1 I=1,MP
    WRITE (6,901) (T (I,J),J=1,1+N)
901    FORMAT (6(1X,F5.1))
1 CONTINUE
    JP=4
    CALL MINR (T,LDT,ROWS,MR,JP,IP)
    WRITE (6,902) JP,IP
902 FORMAT ('in column ',I1,' the minimum ratio row is ',I1)
    STOP
END

```

When this program is compiled and run it produces the following output.

```

unix[1] a.out
    0.0  -2.0   1.0  -1.0   0.0   0.0
    5.0   1.0  -2.0   2.0   1.0   0.0
    5.0   0.0   1.0   1.0   0.0   1.0
in column 4 the minimum ratio row is 2
unix[2]

```

Column 4 has row ratios $5.0/2.0=2.5$ and $5.0/1.0=5.0$, so the minimum-ratio row is row 2.