NAME

ilud - sparse incomplete lu factorization with single dropping and diagonal compensation

CALLING SEQUENCE

[L,U,ierr]=ilud(A,alph,drop)

PARAMETERS

A   : sparse matrix (must be square)

alph   : diagonal compensation parameter (default: 0.5)

drop   : threshold parameter for dropping small terms in the factorization (default: 0.001*max(Aij))

L   : lower triangular sparse matrix

U   : upper triangular sparse matrix

ierr   : error message

DESCRIPTION

Builds an incomplete LU factorization of the sparse matrix **A**. The two factors **L** and **U** are stored in CSR format. The CSR format is the Compressed Sparse Row format used by Scilab.

All diagonal elements of the input matrix must be nonzero.

alph   : The term **alph***(sum of all dropped out elements in a given row) is added to the diagonal element of**U** of the factorization. Thus:

  0 --> ILU with threshold,

  1 --> MILU with threshold.

drop   : During the elimination, a term a(i,j) is dropped whenever abs(a(i,j)) < **drop** * [weighted norm of row i]. Here weighted norm = 1-norm / number of nnz elements in the row.

ierr   : error flag

  0 --> successful return.

 >0 --> zero pivot encountered at step number ierr.

 -1 --> error. input matrix may be wrong. (The elimination process has generated a row in **L** or **U** whose length is .gt. n.)

 -2 --> insufficient storage for the LU factors caused an overflow in arrays alu/jalu.

 -3 --> Zero row encountered.

EXAMPLE

```
A=mmread(SCILIN+'/tests/matrices/nos3.mtx')
n=size(A,1); b=ones(n,1);
alph=0;drop=0;
[L,U]=ilud(A,alph,drop);
x=U\(L\b)
A*x-b
```

AUTHOR

Sparskit procedure interfaced by Aladin Group

SEE ALSO

ilu0, milu0, iluk, ilut, ilutp, iludp