NAME

gmres - generalized minimum residual method with restarts

CALLING SEQUENCE

[x,err,iter,flag,res] = gmres(A,b,x0,M,rstr,maxi,tol)

PARAMETERS

A : n-by-n matrix or function returning **A*x**

b : right hand side vector

x0 : initial guess vector (default: zeros(n,1))

M : preconditioner: matrix or function returning **M*x** (In the first case, default: eye(n,n))

rstr : number of iterations between restarts (default: 10)

maxi : maximum number of iterations (default: n)

tol : error tolerance (default: 1000*%eps)

x : solution vector

err : final residual norm

iter : number of iterations performed

flag : 0 = **gmres** converged to the desired tolerance within **maxi** iterations

1 = no convergence given **maxi**

res : residual vector

DESCRIPTION

Solves the linear system **Ax=b** using the Generalized Minimal residual (GMRES(m)) method with restarts.

EXAMPLE

```
A=mmread(SCILIN+'/tests/matrices/pde225.mtx');
n=siz(A,1);b=ones(n,1);x0=zeros(n,1);
[x,err,iter,flag,res] = gmres(A,b,x0)
M=eye(n,n); max_it=n; tol=1000*%eps;rstr=20;
[x,err,iter,flag,res] = gmres(A,b,x0,M,rstr,max_it,tol)

deff("y=precond(x)","y=(M+eye(size(M,1),size(M,2)))*x");
deff("y=matvec(x)","y=(A+eye(size(A,1),size(A,1)))*x");

[x,err,iter,flag,res] = gmres(matvec,b,x0,precond,rstr,max_it,tol)

[x,err,iter,flag,res] = gmres(A,b,x0,precond)
[x,err,iter,flag,res] = gmres(matvec,b,x0,M)
```

AUTHOR

Adaptation by Aladin Group of the corresponding code of netlib/mltemplatesdev (Univ. of Tennessee and Oak Ridge National Laboratory) - 20 March 2001.

SEE ALSO

bicg, bicgstab, cgs, qmr