

**NAME**

bicgstab - biconjugate gradient stabilized method with preconditioning

**CALLING SEQUENCE**

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

**PARAMETERS**

A : matrix of size n-by-n 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, default: eye(n,n))  
 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 = **bicgstab** converged to the desired tolerance within **maxi** iterations  
       1 = no convergence given **maxi**  
      -1 = breakdown: rho = 0  
      -2 = breakdown: omega = 0  
 res : residual vector

**DESCRIPTION**

Solves the linear system  $Ax=b$  using the BiConjugate Gradient Stabilized Method with preconditioning.

**EXAMPLE**

```
A=makefish(4); b=rand(16,1);x0=zeros(16,1);
[x,err,iter,flag,res] = bicgstab(A,b,x0)
M=eye(16,16); max_it=16; tol=1000*%eps;
[x,err,iter,flag,res] = bicgstab(A,b,x0,M,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] = bicgstab(matvec,b,x0,precond,max_it,tol)

[x,err,iter,flag,res] = bicgstab(A,b,x0,precond)
[x,err,iter,flag,res] = bicgstab(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, cgs, gmres, qmr