Test 1

Contents

Cholesky function

```
% function [L] = Cholesky(A)

%[m,n] = size(A);
%L = zeros(n);

%for k = 1:n
% L(k:n,k) = A(k:n,k)/sqrt(A(k,k));
% for j = k+1:n
%   A(j,k+1:n) = A(j,k+1:n)-L(j,k)*A(k,k+1:n);
% end
%end
```

```
%%Begin to test the Cholesky decompostion
%
fprintf("test1, n =3\n");
test = randn(3)
L = Cholesky(test)
L = L'

fprintf("test2, n=4\n");
test = randn(4)
L = Cholesky(test)
L = L'

fprintf("test3, n=5\n");
test = randn(5)
L = Cholesky(test)
L = L'
%
```

test1, n = 3
test =
   −0.211445   −1.397105   0.391013
   −0.596324   −1.091167   0.276711
   −0.039861   −0.875082   −0.475900
L =
   0.00000 + 0.45983 i   0.00000 + 0.00000 i   0.00000 +
      0.00000 i
   2.82023 + 0.00000 i   1.68789 + 0.00000 i   0.00000 +
      0.00000 i
   0.18852 + 0.00000 i   −0.21471 + 0.00000 i   0.00000 +
      0.85263 i
L =
   0.00000 − 0.45983 i   2.82023 − 0.00000 i   0.18852 −
      0.00000 i
   0.00000 − 0.00000 i   1.68789 − 0.00000 i   −0.21471 −
      0.00000 i
   0.00000 − 0.00000 i   0.00000 − 0.00000 i   0.00000 −
      0.85263 i
test2, n=4
test =
   0.6573876   −0.4810617   1.5296332   −0.5262379
   −0.3352613   −0.3052796   −0.9833719   1.3492121
   2.4974906   0.0016343   0.2639702   0.9161637
   0.7277409   −0.1602177   −0.4578792   0.3948087
L =
 Columns 1 through 3:
   0.81079 + 0.00000 i   0.00000 + 0.00000 i   0.00000 +
      0.00000 i
   −0.50999 + 0.00000 i   0.00000 + 0.74204 i   0.00000 +
      0.00000 i
   3.79911 + 0.00000 i   −3.32217 + 0.00000 i   0.00000 +
      2.49451 i
   1.10702 + 0.00000 i   −0.67620 + 0.00000 i   0.36780 +
      0.00000 i
 Column 4:
   0.00000 + 0.00000 i
   0.00000 + 0.00000 i
   0.00000 + 0.00000 i
   0.00000 + 0.82748 i
L =
 Columns 1 through 3:
   0.81079 − 0.00000 i   −0.50999 − 0.00000 i   3.79911 −
      0.00000 i
   0.00000 − 0.00000 i   0.00000 − 0.74204 i   −3.32217 −
      0.00000 i

```
    0.00000 − 0.00000 i    0.00000 − 0.00000 i    0.00000 −
        2.49451 i
    0.00000 − 0.00000 i    0.00000 − 0.00000 i    0.00000 −
        0.00000 i
 Column  4 :
    1.10702 − 0.00000 i
   −0.67620 − 0.00000 i
    0.36780 − 0.00000 i
    0.00000 − 0.82748 i
test3 ,  n=5
test  =
   −1.267023    1.768126    0.623398   −0.646482   −0.541353
   −0.086009   −0.556941    0.374881   −0.179019    0.458836
   −0.389289   −0.013177    0.250832   −0.704948   −0.124355
    1.006972   −1.696901    0.815315    0.538819    1.139241
    0.996255    0.866766   −0.843067    0.056827   −0.424452
L  =
 Columns  1  through  3 :
    0.00000 + 1.12562 i    0.00000 + 0.00000 i    0.00000 +
        0.00000 i
    0.06788 + 0.00000 i    0.00000 + 0.82278 i    0.00000 +
        0.00000 i
    0.30725 + 0.00000 i    0.82194 + 0.00000 i    0.00000 +
        0.46266 i
   −0.79475 + 0.00000 i    0.43085 + 0.00000 i   −5.45416 +
        0.00000 i
   −0.78630 + 0.00000 i   −3.33404 + 0.00000 i   −3.53131 +
        0.00000 i
 Columns  4  and  5 :
    0.00000 + 0.00000 i    0.00000 + 0.00000 i
    0.00000 + 0.00000 i    0.00000 + 0.00000 i
    0.00000 + 0.00000 i    0.00000 + 0.00000 i
    0.00000 + 1.43961 i    0.00000 + 0.00000 i
    1.10870 + 0.00000 i    1.08260 + 0.00000 i
L  =
 Columns  1  through  3 :
    0.00000 − 1.12562 i    0.06788 − 0.00000 i    0.30725 −
        0.00000 i
    0.00000 − 0.00000 i    0.00000 − 0.82278 i    0.82194 −
        0.00000 i
    0.00000 − 0.00000 i    0.00000 − 0.00000 i    0.00000 −
        0.46266 i
    0.00000 − 0.00000 i    0.00000 − 0.00000 i    0.00000 −
        0.00000 i
    0.00000 − 0.00000 i    0.00000 − 0.00000 i    0.00000 −
        0.00000 i
```

Columns 4 and 5:
$$
\begin{array}{cc}
-0.79475 - 0.00000\,\mathrm{i} & -0.78630 - 0.00000\,\mathrm{i} \\
0.43085 - 0.00000\,\mathrm{i} & -3.33404 - 0.00000\,\mathrm{i} \\
-5.45416 - 0.00000\,\mathrm{i} & -3.53131 - 0.00000\,\mathrm{i} \\
0.00000 - 1.43961\,\mathrm{i} & 1.10870 - 0.00000\,\mathrm{i} \\
0.00000 - 0.00000\,\mathrm{i} & 1.08260 - 0.00000\,\mathrm{i}
\end{array}
$$