```
fprintf("Compute an eigenvalue–eigenvector pair of the matrix\n\n");
clear
close all;
%initial vector
x0 = [1 1 1 1 1 1]'./(6^0.5);
%matrix A
m = 6; n = 6;
A = matrix(m,n)

%tolerance
ep = 1e-10;

%fuction rqi
[v,lam] = rqi(A,x0,ep)
fprintf("Eigen value and its corresponding eigen vector to which the code converges are v and lam.\n\n");

%verification
[V,D] = eig(A);

fprintf("The error in the approximate eigen value.\n\n");
error_lam = abs(D(4,4) - lam)
fprintf("The error in the approximate eigen value.\n\n");
error_v = abs(V(:,4) - (-v))
fprintf("Hence v and lam are well aprroximated since the error is too small.\n\n");

function A = matrix(m,n)
    A = zeros(m,n);
    for i = 1:n
       for j = 1:m
          if i ==j
             A(i,j) = -2;
          elseif i == j+1
             A(i,j) = 1;
          elseif i == j-1
             A(i,j) = 1;
          end
          A(1,2) = 2;
       end

    end
end
```

```
Compute an eigenvalue–eigenvector pair of the matrix


A =

    -2     2     0     0     0     0
     1    -2     1     0     0     0
     0     1    -2     1     0     0
     0     0     1    -2     1     0
     0     0     0     1    -2     1
     0     0     0     0     1    -2

The code converged at 4 iterations to solution

v =

  -0.534522431006303
  -0.516309036260995
```

```
  -0.462910056395315
  -0.377964522630757
  -0.267261309845902
  -0.138344647190983


lam =

  -0.068148339178898
```

Eigen value and its corresponding eigen vector to which the code converges are v and lam.

The error in the approximate eigen value.

```
error_lam =

     8.242965809923675e-09
```

The error in the approximate eigen value.

```
error_v =

   1.0e-07 *

   0.528185452042251
   0.355976077504039
   0.065090395295897
   0.496215292189461
   0.679334780095964
   0.483416076335619
```

Hence v and lam are well aprroximated since the error is too small.

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