# Problem 3a

```matlab
clear all
clc

A = [ 10/3 -5/3 0 5/3 2;
      -1/3 -4/3 0 1/3 4;
      2 -1 -4 -2 3;
      10 -23 -27 -5 33;
      5/3 -13/3 -6 -5/3 9];

x_guess = [-1 0 0 0 0; -1 -1 0 0 0; 0 0 1 0 0; 0 0 1 1 1; 0 0 0 1 1];

x_guess1 = [-1 0 0 0 0]';
x_guess2 = [0 -1 0 0 0]';
x_guess3 = [0 1 1 1 0]';
x_guess4 = [0 0 -1 1 1]';
x_guess5 = [0 0 0 1 1]';


% x_guess0 = [x_guess1; x_guess2; x_guess3; x_guess4; x_guess5]';

%normalize
% xg1norm = x_guess1/norm(x_guess1);
% xg2norm = x_guess2/norm(x_guess2);
% xg3norm = x_guess3/norm(x_guess3);
% xg4norm = x_guess4/norm(x_guess4);
% xg5norm = x_guess5/norm(x_guess5);


[xg1, yg1, itr_fin1, eig_S1, lambda1 ] = riterq(A, x_guess1, 1000);
[xg2, yg2, itr_fin2, eig_S2, lambda2 ] = riterq(A, x_guess2, 1000);
[xg3, yg3, itr_fin3, eig_S3, lambda3 ] = riterq(A, x_guess3, 1000);
[xg4, yg4, itr_fin4, eig_S4, lambda4 ] = riterq(A, x_guess4, 1000);
[xg5, yg5, itr_fin5, eig_S5, lambda5 ] = riterq(A, x_guess5, 1000);


%echo
echo on
diary vj_problem3a.txt
%intial xguess
x_guess1
x_guess2
x_guess3
x_guess4
x_guess5

%yguess history
yg1
yg2
yg3
yg4
```

```
yg5
```

```
%best guess xk final
eig_S1
eig_S2
eig_S3
eig_S4
eig_S5
```

*Warning: Matrix is close to singular or badly scaled. Results may be*
  *inaccurate.*
*RCOND =  1.106200e-18.*
*Warning: Matrix is close to singular or badly scaled. Results may be*
  *inaccurate.*
*RCOND =  5.018128e-17.*
*Warning: Matrix is close to singular or badly scaled. Results may be*
  *inaccurate.*
*RCOND =  1.106200e-18.*
*diary vj_problem3a.txt*
*%intial xguess*
*x_guess1*

*x_guess1 =*

     *-1*
      *0*
      *0*
      *0*
      *0*

*x_guess2*

*x_guess2 =*

      *0*
     *-1*
      *0*
      *0*
      *0*

*x_guess3*

*x_guess3 =*

      *0*
      *1*
      *1*
      *1*
      *0*

*x_guess4*

*x_guess4 =*

```
        0
        0
       -1
        1
        1

x_guess5

x_guess5 =

        0
        0
        0
        1
        1


%yguess history
yg1

yg1 =

  Columns 1 through 7

    3.3333    3.8366    3.5553    3.2873    2.9662    2.9994    3.0000

  Column 8

    3.0000

yg2

yg2 =

   -1.3333   -1.2569   -1.0159   -1.0001   -1.0000   -1.0000

yg3

yg3 =

  -21.0000  -14.3344   -9.0795   -7.2711   -7.0057   -7.0000   -7.0000

yg4

yg4 =

  Columns 1 through 7

   21.1111   13.6219    7.8920    5.6692    5.1041    5.0045    5.0000

  Columns 8 through 10

    5.0000    5.0000    5.0000
```

```
yg5

yg5 =

  Columns 1 through 7

    17.6667    10.3264    6.5796    5.3298    5.0361    5.0006    5.0000

  Columns 8 through 10

    5.0000    5.0000    5.0000


%best guess xk final
eig_S1

eig_S1 =

    0.5774
   -0.5774
    0.0000
   -0.0000
   -0.5774

eig_S2

eig_S2 =

   -0.0000
   -0.5774
    0.5774
   -0.5774
    0.0000

eig_S3

eig_S3 =

   -0.2085
   -0.2085
    0.4170
    0.8341
    0.2085

eig_S4

eig_S4 =

    0.7071
    0.0000
    0.0000
    0.7071
    0.0000
```

```
eig_S5

eig_S5 =

    0.7071
    0.0000
    0.0000
    0.7071
    0.0000
```

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