```
%A=[4 -1 0 0 0 0; -1 4 -1 0 0 0; 0 -1 4 -1 0 0; 0 0 -1 4 -1 0; 0 0 0 -1 4 -1; 0 0 0 0 -1 4]
function [] = SelfPower2()
A=input('Enter the matrix A : \n');
MaxNumIter=2000;
len=length(A);
vec=zeros(len-1,1);
vec=[1;vec];
tol=power(10,-8);
val1=0;
if ~issparse(A)
 A = sparse(A);
end
fprintf("Iteration lambda\n");

for i=1:MaxNumIter
    v=A*vec;
    flag=norm(vec);
    val2=v.'*vec/flag^2;
    temp=abs(val1-val2);
    val1=val2;

    vec=v/norm(v);
    if(i>1 && temp<=tol*(abs(val2)))
        break;
    end


    if ismember(i, [1, 2, 3, 4, 5, 10, 30, 50, 100, 300, 500, 1000])
        fprintf('%d : %f\n', i, val1);
    end
end

 vec=sparse(vec);

disp('Dominant eigen value: ');
val1
disp('Corresponding eigen vector');
vec
disp("Using inbuilt function");
[V,D] = eigs(A,1,'lm');
lambda = D(1,1);
x = V(:,1);
lambda
x
end
```

```
>> SelfPower2
Enter the matrix A :
[4 -1 0 0 0 0; -1 4 -1 0 0 0; 0 -1 4 -1 0 0; 0 0 -1 4 -1 0; 0 0 0 -1 4 -1; 0 0 0 0 -1 ↙
4]
Iteration lambda
1 : 4.000000
2 : 4.470588
3 : 4.813559
4 : 5.047857
5 : 5.209832
10 : 5.577467
30 : 5.796699
50 : 5.801843
Dominant eigen value:

val1 =

    5.8019

Corresponding eigen vector

vec =

   (1,1)       0.2322
   (2,1)      -0.4182
   (3,1)       0.5213
   (4,1)      -0.5210
   (5,1)       0.4176
   (6,1)      -0.2317

Using inbuilt function

lambda =

    5.8019


x =

    0.2319
   -0.4179
    0.5211
   -0.5211
    0.4179
   -0.2319

>>
```

```
 1 %A=[4 -1 0 0 0 0; -1 4 -1 0 0 0; 0 -1 4 -1 0 0; 0 0 -1 4 -1 0; 0 0 0 -1 4 -1; 0 0
0 0 -1 4]
 2 %b=[0;5;0;6;-2;6]
 3
 4 function[]=SelfSD()
 5 A=input('Enter the matrix A : \n');
 6 b=input('Enter the matrix b : \n');
 7 len=length(A);
 8 MaxNumIter=2000;
 9 x=zeros(size(b));
10 tol=power(10,-8);
11 R=b;
12 res=norm(R);
13
14 for i=1:MaxNumIter
15     if(res<tol)
16         break;
17     end
18    Q=A*R;
19    temp1=(R'*R);
20    temp2=R'*Q;
21    temp3=temp1/temp2;
22
23    x=temp3*R+x;
24    R=R-temp3*Q;
25    res=norm(R);
26 end
27 disp('Solution using SelfSD function');
28 x
29 end
30
```

```
>> SelfSD
Enter the matrix A :
[4 -1 0 0 0 0; -1 4 -1 0 0 0; 0 -1 4 -1 0 0; 0 0 -1 4 -1 0; 0 0 0 -1 4 -1; 0 0 0 0 -1 ↙
4]
Enter the matrix b :
[0;5;0;6;-2;6]
Solution using SelfSD function

x =

    0.3892
    1.5569
    0.8382
    1.7959
    0.3456
    1.5864

>>
```