```
k=6400; %1/.002
```

```
k = 6400
```

build the A matrix with the following code

```
A = zeros(80,80);
for i=3:78
    if mod(i,2) == 1 %to do if i is odd
        A(i, i+1) =1;
    else % to do if i is even
        A(i, i-3) =k;
        A(i, i-1)= -2*k;
        A(i, i+1) = k;

    end
end
A(1,2)=1;
A(2,1)=-2*k;
A(2,3)=k;
A(79,80)=1;
A(80,79)=-2*k;
A(80,77)=k;
A
```

```
A = 80×80

         0          1          0          0          0          0          0          0
    -12800          0       6400          0          0          0          0          0
         0          0          0          1          0          0          0          0
      6400          0     -12800          0       6400          0          0          0
         0          0          0          0          0          1          0          0
         0          0       6400          0     -12800          0       6400          0
         0          0          0          0          0          0          0          1
         0          0          0          0       6400          0     -12800          0
         0          0          0          0          0          0          0          0
         0          0          0          0          0          0       6400          0
```

build the C matrix with the following code

```
C= zeros(40,80);
for i = 1:40
    C(i,(2*i)-1)=1;
end
C
```

```
C = 40×80
```

1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

find the eigenvalues of A and sort them in ascending order

```
lamda=sort(eig(A))
```

lam = _80×1 complex_

$10^2 \times$
-0.0000 - 0.0613i
-0.0000 + 0.0613i
0.0000 - 0.1225i
0.0000 + 0.1225i
-0.0000 - 0.1835i
-0.0000 + 0.1835i
-0.0000 - 0.2442i
-0.0000 + 0.2442i
0.0000 - 0.3046i
0.0000 + 0.3046i