

```

#code written in octave
#for the example in 7.6
i = sqrt(-1);
xinit = [0 ; 1]
A = [3 -5; 1 -1]
[eigenvector,lamda] = eig(A)
S = [0 -5; 1 -2]
sInverse = inv(S)
SinvAS = sInverse*A*S
SinvAS(:, 1);
r = norm(SinvAS(:, 1))
tht = arg(SinvAS(1, 1) + SinvAS(2, 1)*i)
intialPosition= sInverse*xinit

```

```

#just for intializing

```

```

h = xinit;
hcircle = xinit;
hellipse = xinit;
m = [];
x = [];
y = [];
xcircle = [];
ycircle = [];
xellipse = [];
yellipse = [];

```

```

for t = 0:.05:8

```

```

    m = [cos(tht*t) -sin(tht*t); sin(tht*t) cos(tht*t)];

```

```

    f = (r**t)*S*(m)*sInverse*xinit;

```

```

    fcircle = (m)*sInverse*xinit;

```

```

    fellipse = S*(m)*sInverse*xinit;

```

```

    h = [h f];

```

```

    hcircle = [hcircle fcircle];

```

```

    hellipse = [hellipse fellipse];

```

```

    x = [x f(1,1)];

```

```

    y = [y f(2,1)];

```

```

    xcircle = [xcircle fcircle(1,1)];

```

```

    ycircle = [ycircle fcircle(2,1)];

```

```

    xellipse = [xellipse fellipse(1,1)];

```

```
    yellipse = [yellipse fellipse(2,1)];  
endfor
```

```
plot(x,y,'b')  
hold on  
plot(xcircle,ycircle,'g')  
hold on  
plot(xellipse,yellipse,'r')  
hold on
```

```
if(r>=1)  
    disp("Unstable")  
else  
    disp("Stable")  
endif
```