a)

In the equilibrium point,

So, z = 0 and = 0

So,

So,

b)

based on a), in the equilibrium point, , and is a positive constant,

so x = 0,

so = 0

so,

so,

so, for egio value on

so,

so,

i)

so, so it is stable

ii)

so, then it is stable

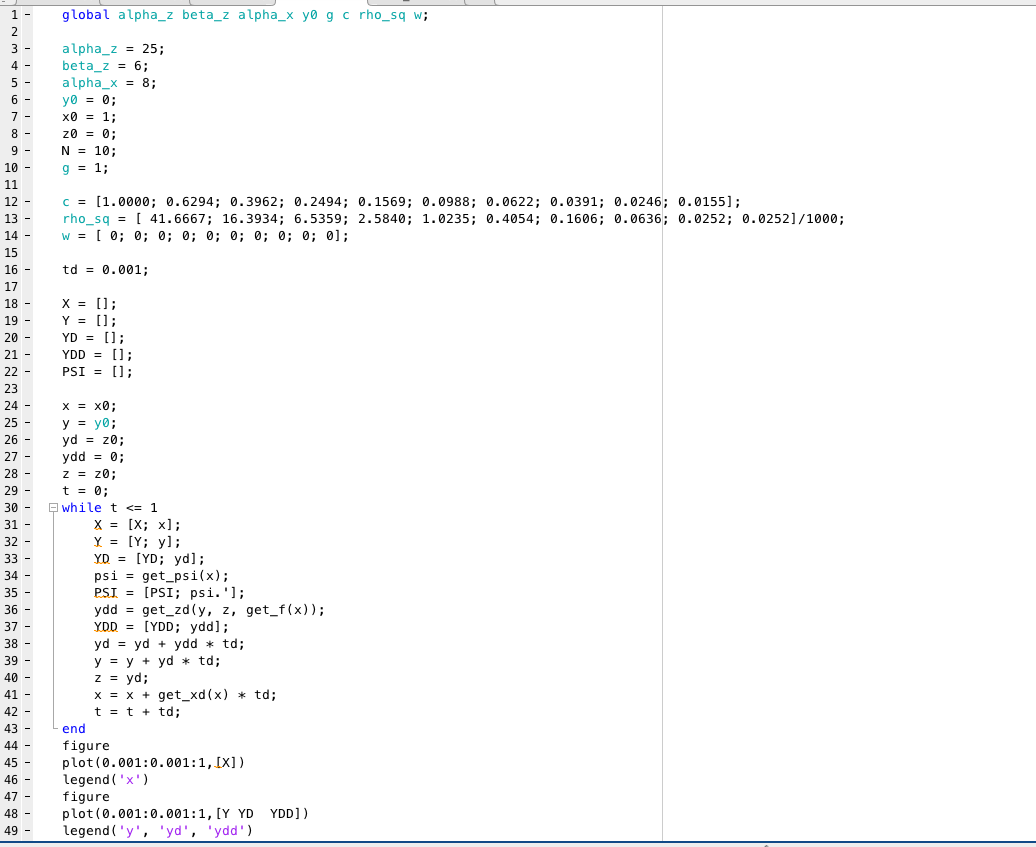
or , because

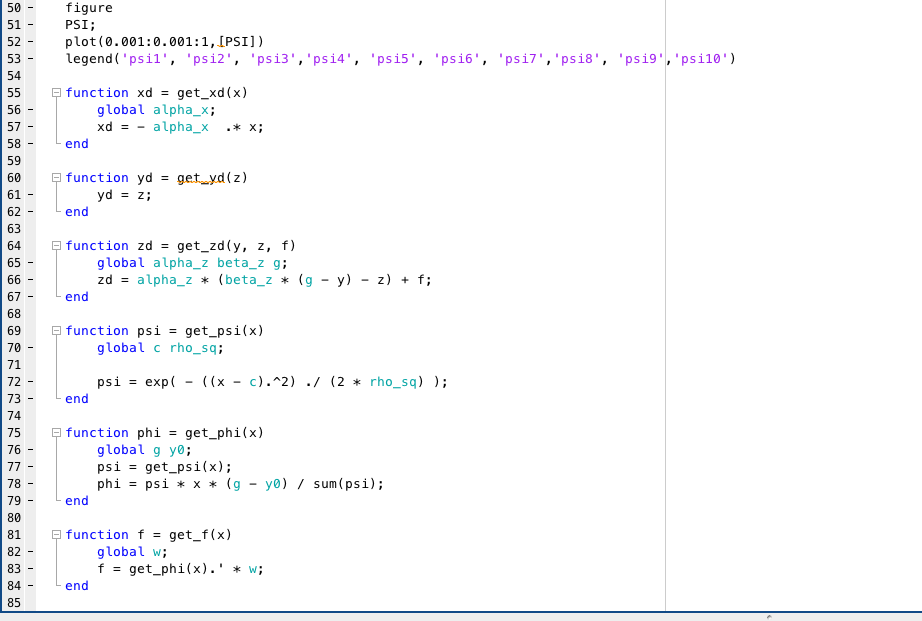
so,

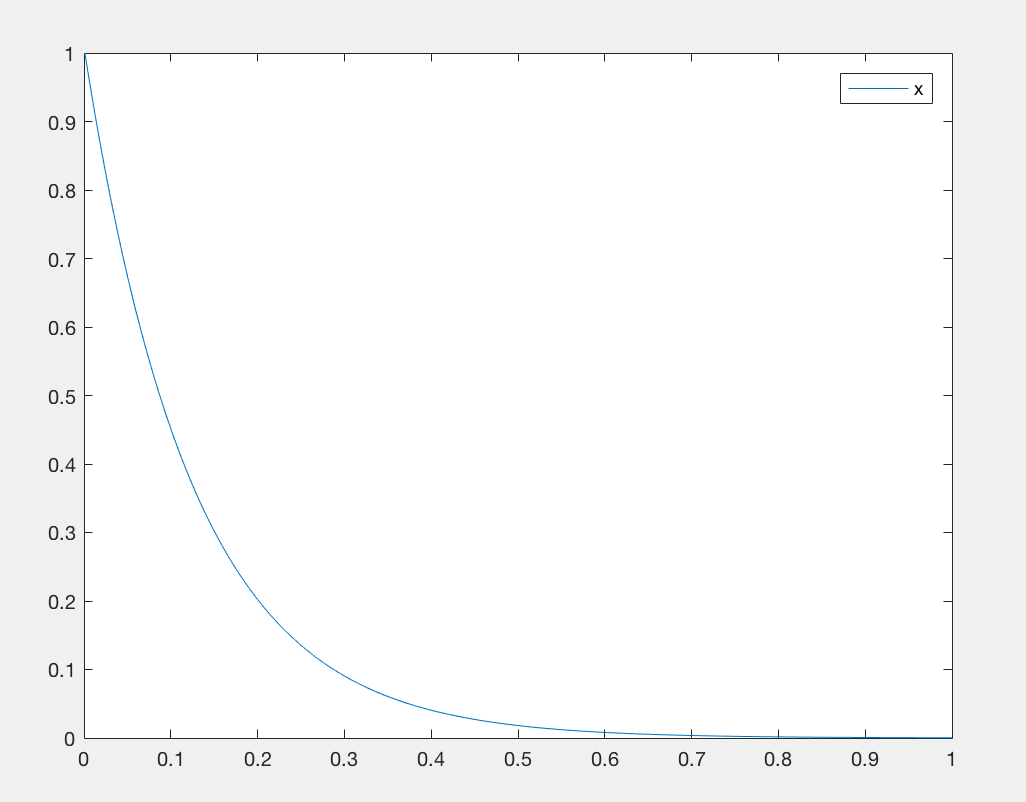
so it is stable

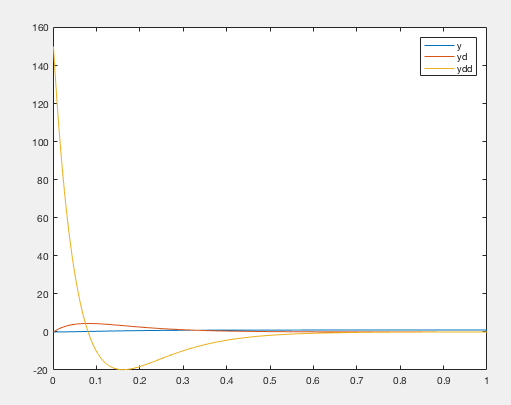
so no matter what, it is stable.

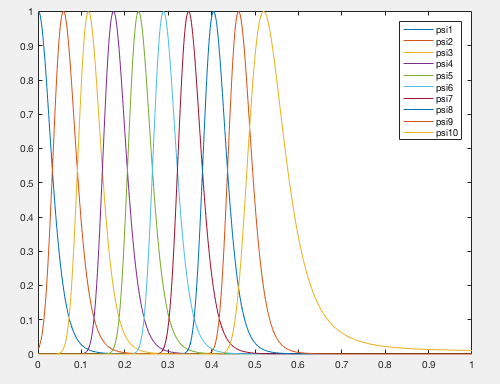
c)











d)

w = [ 1; 200; 3; 4000; 5; 6; 70000; 8; 9; 1000];

the plot will become like this

