ENEE 765   2017   Homework #1
                            due : 2017·09·14

1.   Consider the closed loop system

$$\dot{y} = (a - bk)y$$

$$\dot{k} = \beta y^2$$

under assumptions of Lecture Notes 1.

(i)   Solve explicitly this system to obtain
$y(t)$ and $k(t)$ in analytical form.
Write a MATLAB script to plot the
results in (y, k) plane and display
the same for a range of initial
conditions.   (make a reasonable choice of
a and b)

(ii) Write a separate MATLAB
script using a standard numerical
integration routine, and check it
against your results in (i), for same
choice of a and b and same initial
conditions.
                        (and hence β)
(iii) Now allow b to be time varying
by multiplying the choice of b you made
earlier by $\sin(\omega t)$ for $\omega = 0.1$, $\omega = 0.5$

and $\omega = 0.1$. Use the numerical method you used in (ii) to integrate closed loop system. Discuss the observed results in these three cases of ω.

2 READING

Read and understand closely chapters 0 and 1 of the Sastry-Bodson book upto page 24.