Contents

***Abstract*—This manual is an introduction to control systems based on GATE problems.Links to sample Python codes are available in the text.**

Download python codes using svn co https://github.com/gadepall/school/trunk/control/codes

1 Stability

2 Routh Hurwitz Criterion

3 Compensators

4 Nyquist Plot

4.1. For a system having transfer function G(s) = $\frac{-s+1}{s+1}$,a unit step input is applied at t = 0 .The value of the system at t =1.5 sec is
Solution:
Given x(t) = u(t) a unit step signal .The Laplace transform of x(t) is:

$$X(s) = \int_0^\infty x(t)e^{-st}dt \tag{4.1.1}$$

$$X(s) = \frac{1}{s} \tag{4.1.2}$$

In Laplace domain ,

$$Y(s) = X(s)G(s) \tag{4.1.3}$$

$$Y(s) = \frac{-s+1}{s(s+1)} \tag{4.1.4}$$

By doing partial fractions ,

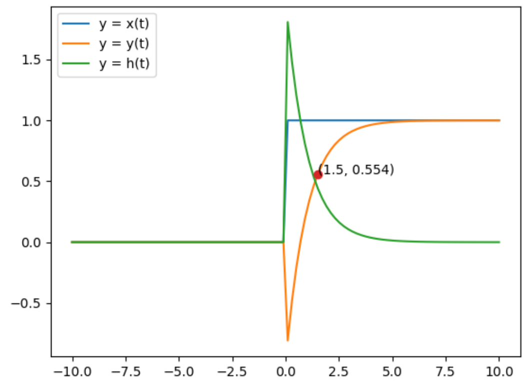
$$Y(s) = \frac{1}{s} - \frac{2}{s+1} \tag{4.1.5}$$

The inverse Laplace transform of Y(s) is,

$$y(t) = u(t) - 2e^{-t}u(t) \tag{4.1.6}$$

y(t) at t = 1.5sec

$$y(1.5) = 0.55 \tag{4.1.7}$$



4.2. Python code for below graph codes/ee18btech11042/graph plot.py