

Simulations have been done based on nearly same rise time. By seeing results of simulation tuning parameters have been decided.

1.a. Simulation for bumpless controller with $T_c = S_c$, simulation for unit step change

for $K = 2$; $t_i = 40$; $t_d = 2.5$;

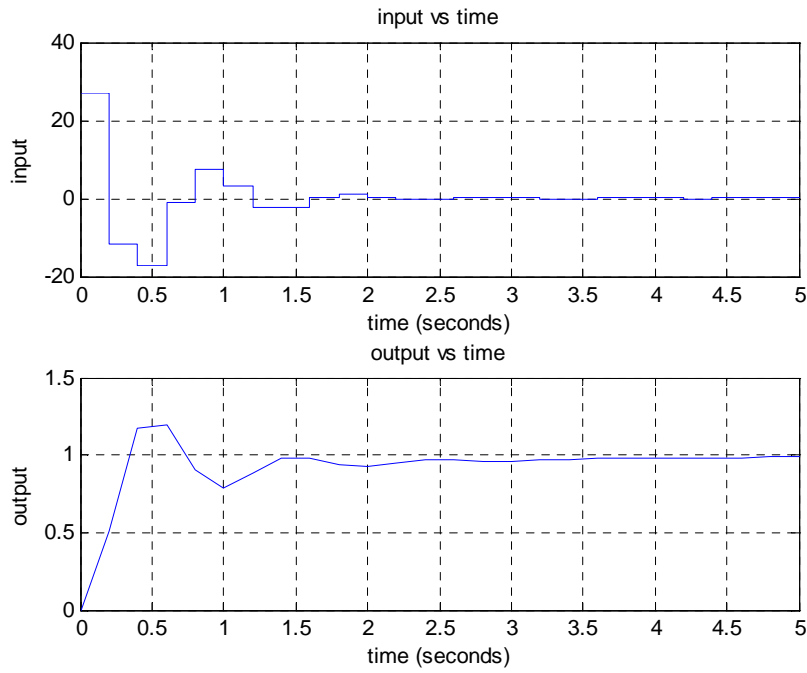


Figure 1

1.b. Simulation for bumpless controller with $T_c = S_c$, simulation for unit ramp input

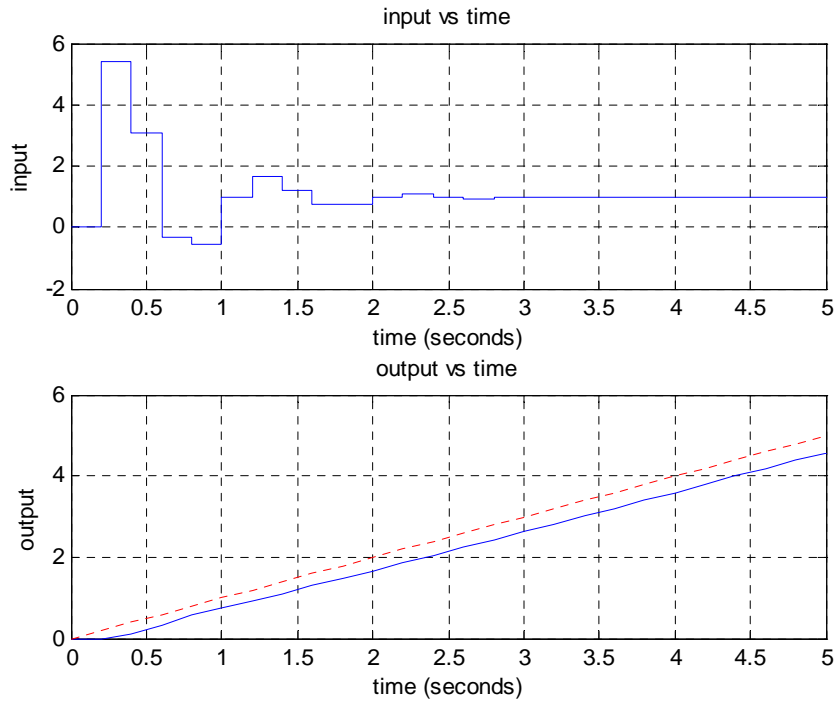


Figure 2

2.a. Simulation for with filtering and $T_c = S_c$

for $K = 3$; $t_i = 40$; $t_d = 1.2$;

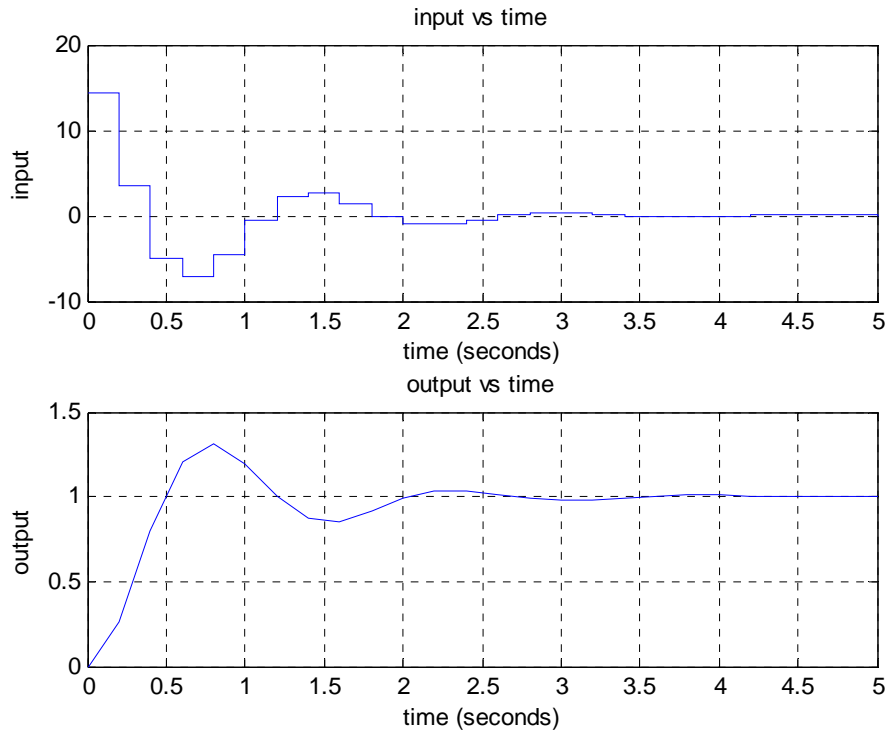


Figure 3

2.b. Simulation for with filtering and $T_c = S_c$, for unit slope ramp input

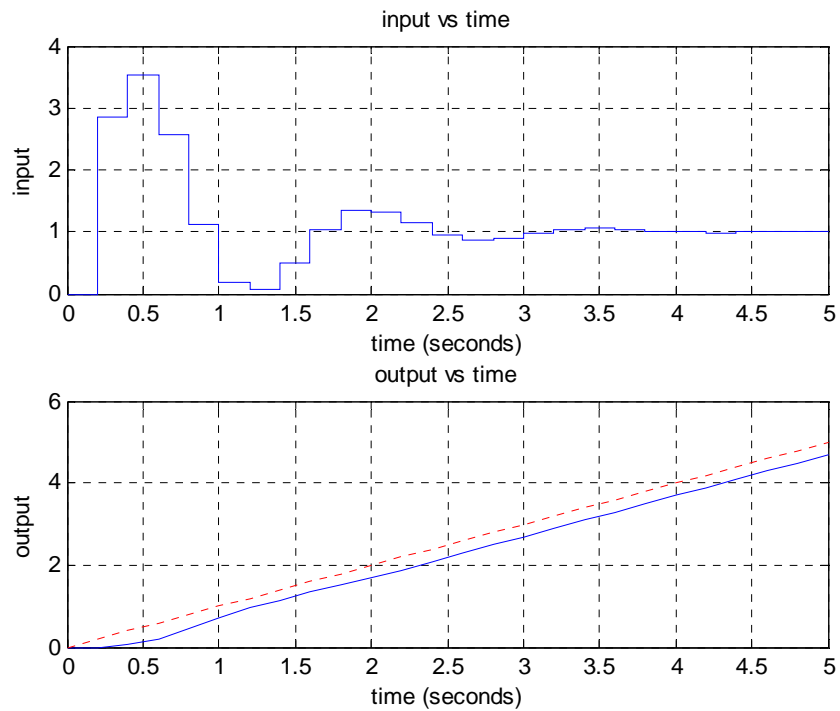


Figure 4

3.a. 2-DOF PID Controller with $T_c = S_c(1)$, for unit step input

for $K = 15$; $t_i = 0.8$; $t_d = 0.30$;

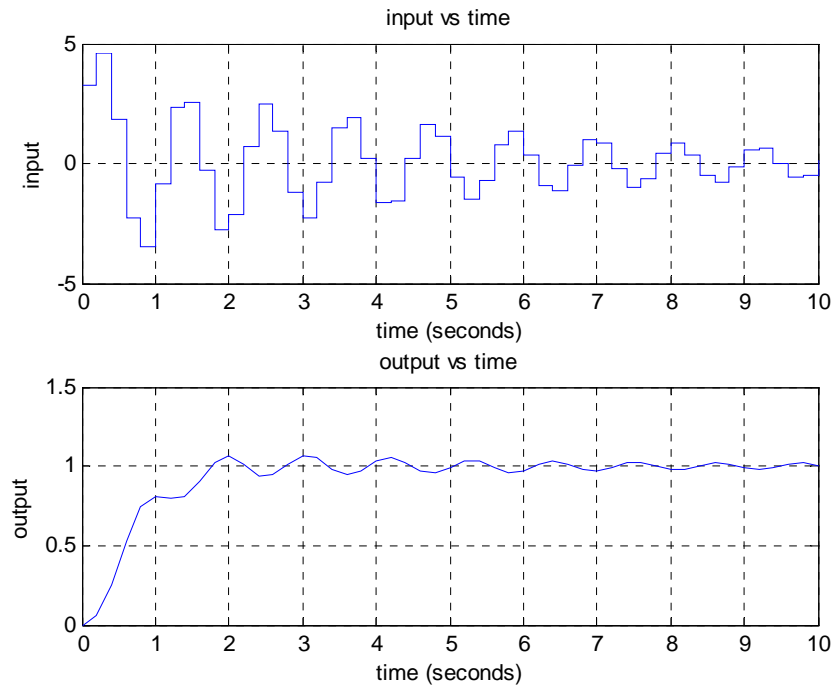


Figure 5

3.b. 2-DOF PID Controller with $T_c = S_c(1)$, for unit ramp input

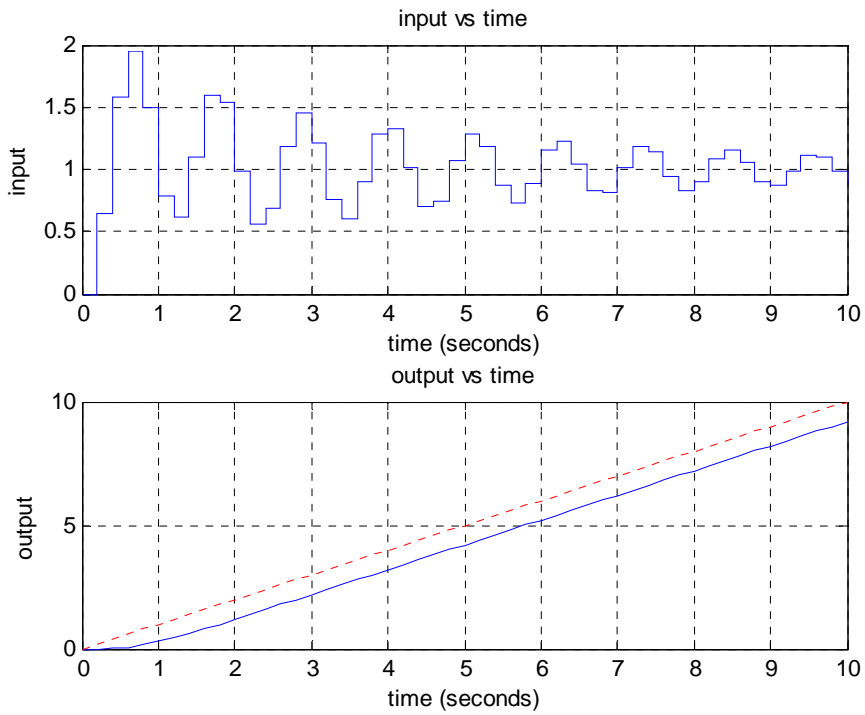


Figure 6

4.a. 2-DOF PID Controller with $T_c = S_c(1)$ and $N = \text{infinite}$, for unit step input

for $K = 30$; $t_i = 0.4$; $t_d = 0.1$;

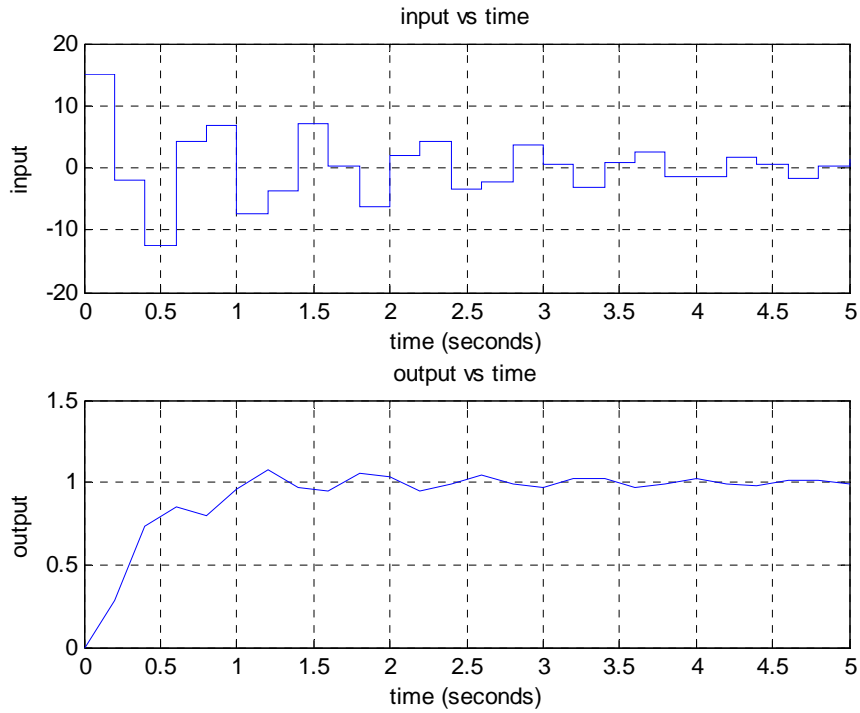


Figure 7

4.b. 2-DOF PID Controller with $T_c = S_c(1)$ and $N = \text{infinite}$, for unit ramp input

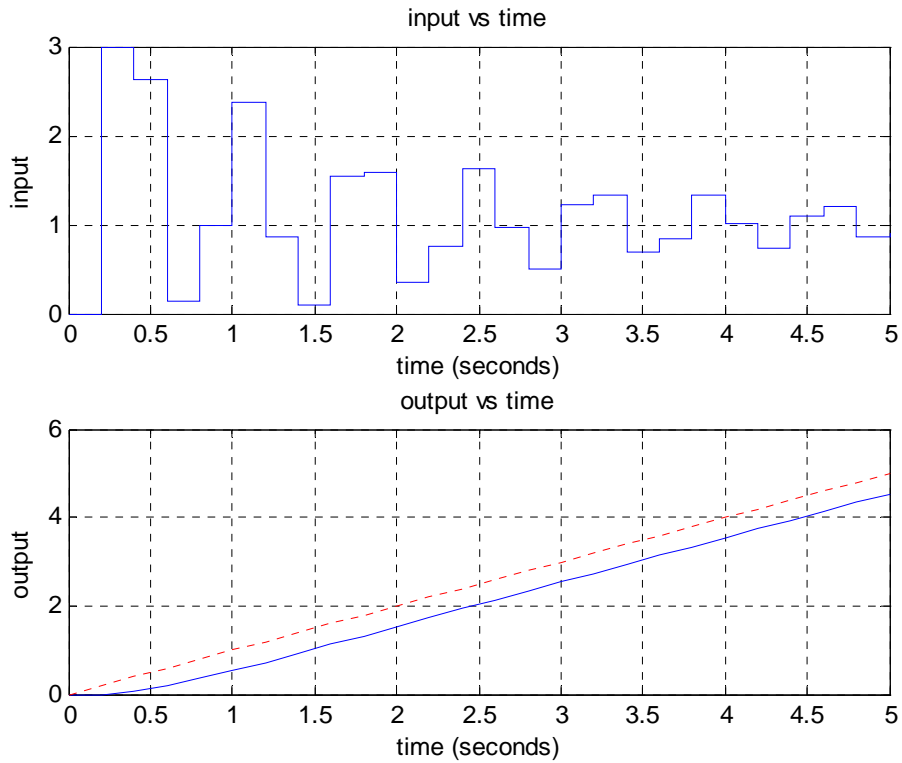


Figure 8

5.a. 2-DOF PID Controller with $T_c(1) = S_c(1)$, for $b = 0.5$, for unit step input

for $K = 15$; $t_i = 0.8$; $t_d = 0.35$;

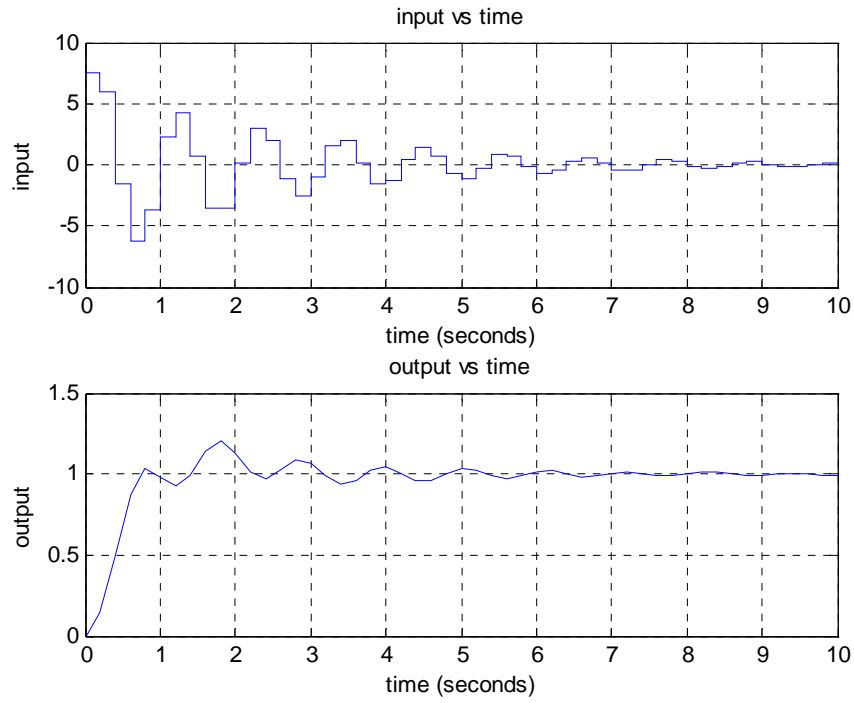


Figure 9

5.b. 2-DOF PID Controller with $T_c(1) = S_c(1)$, for $b = 0.3$, for unit step input

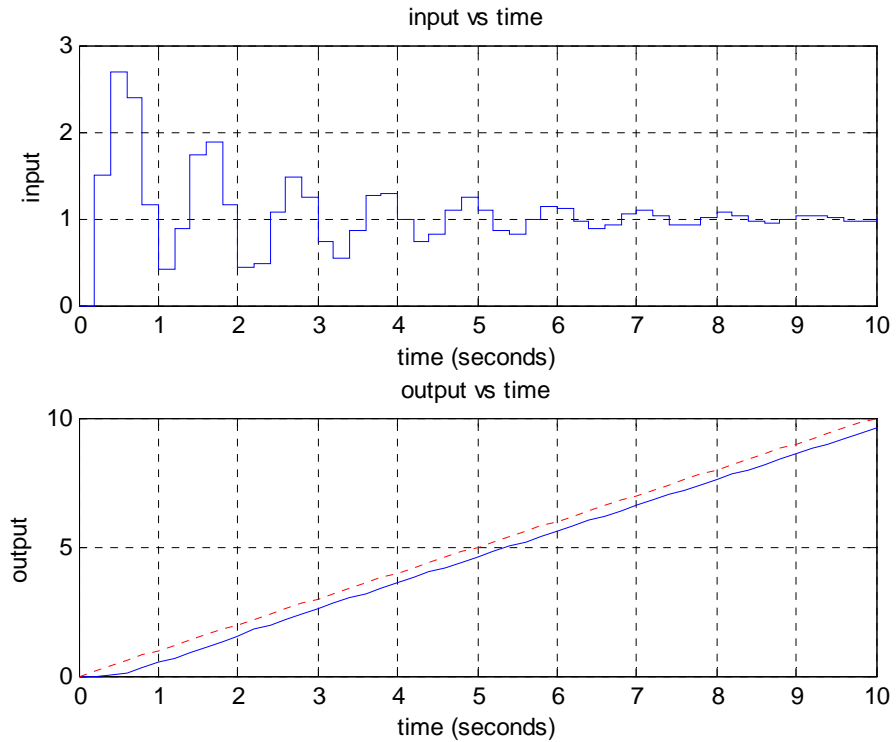


Figure 10