

Final exam

Alberto Javier Pelayo Brambila – A01636406

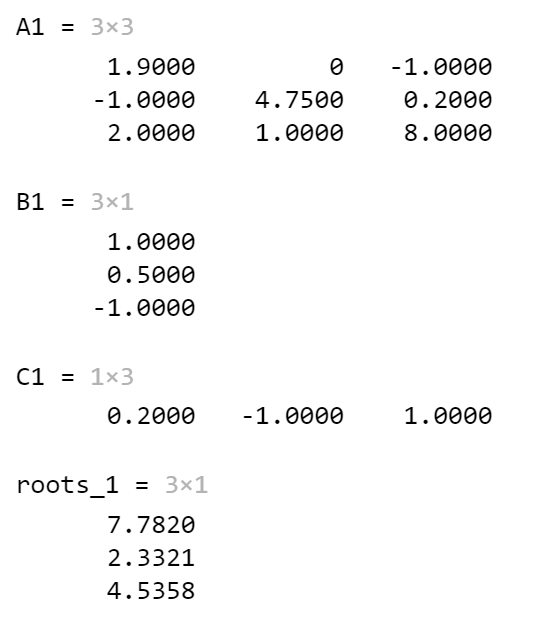


4 de diciembre de 2021

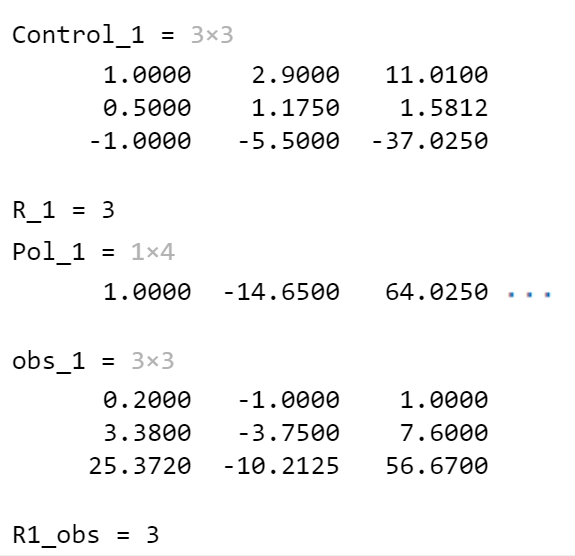
Control Engineering

Dr. Enrique Aguayo

Exercise 1



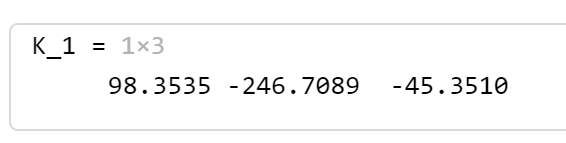
UNSTABLE



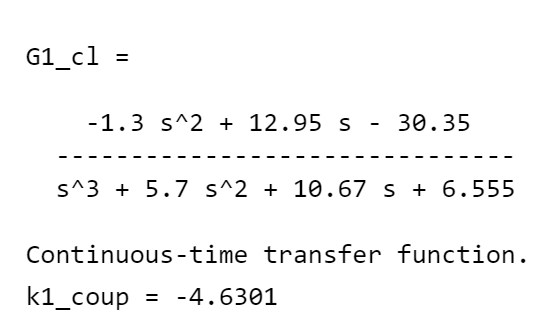
The rank and degree match therefore is controllable

To obtain K





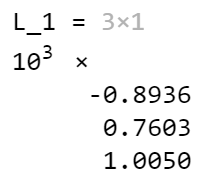
To obtain v



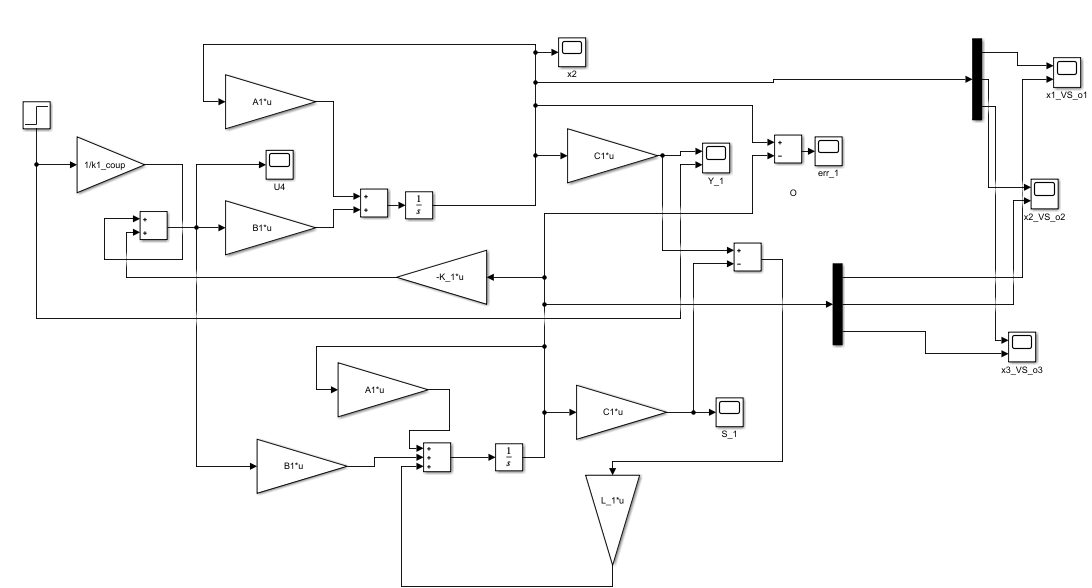


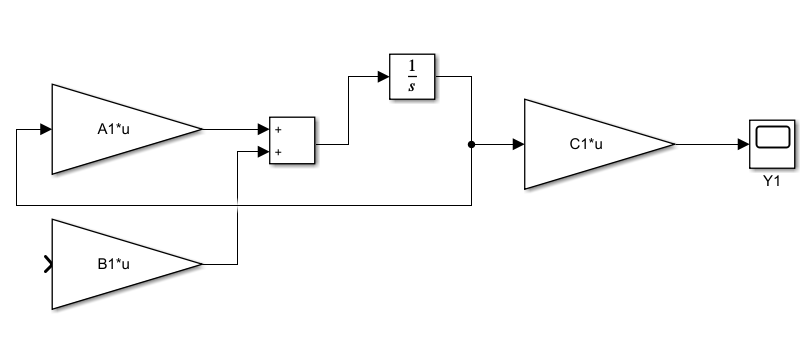
To obtain L

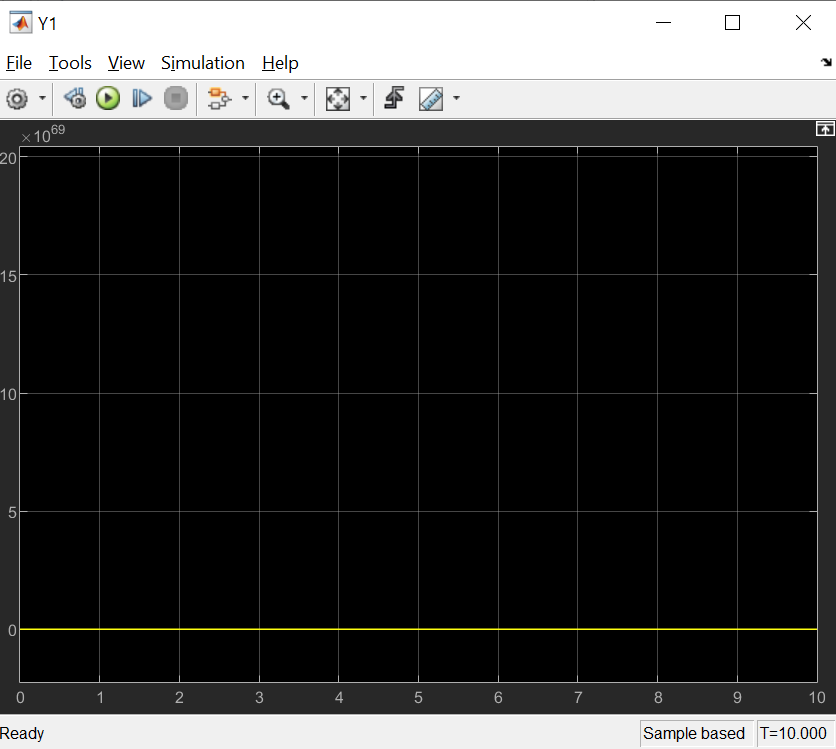


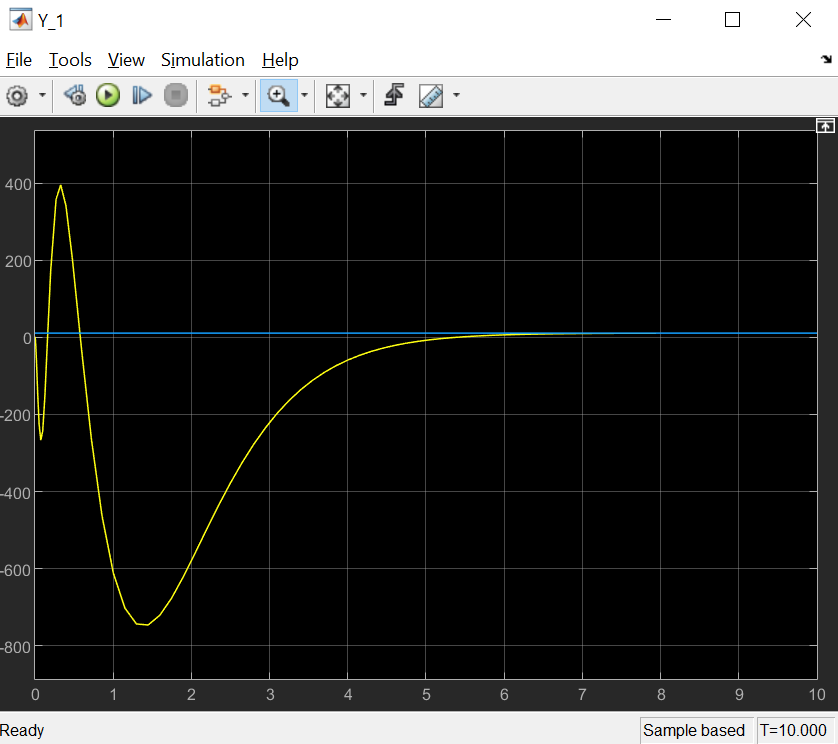


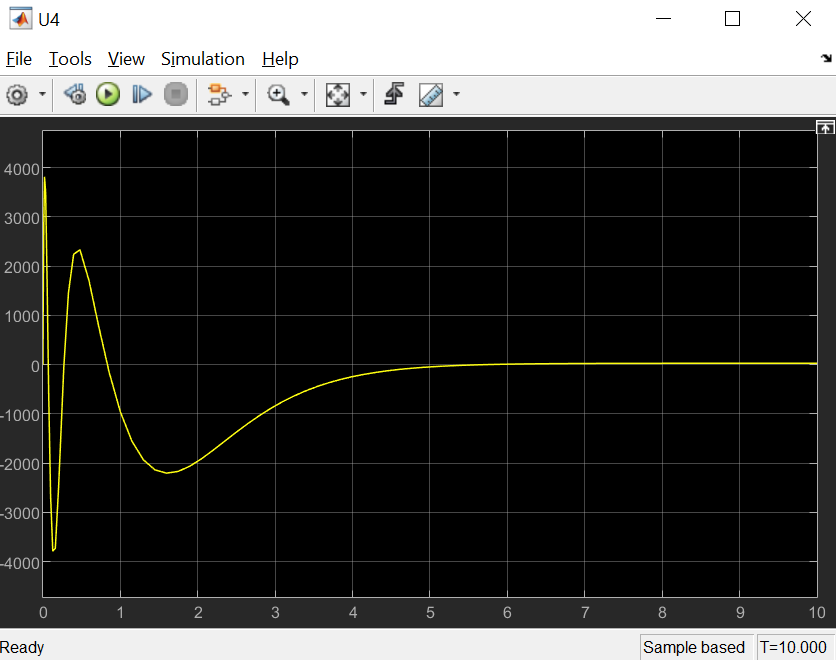
The Simulink model is the following

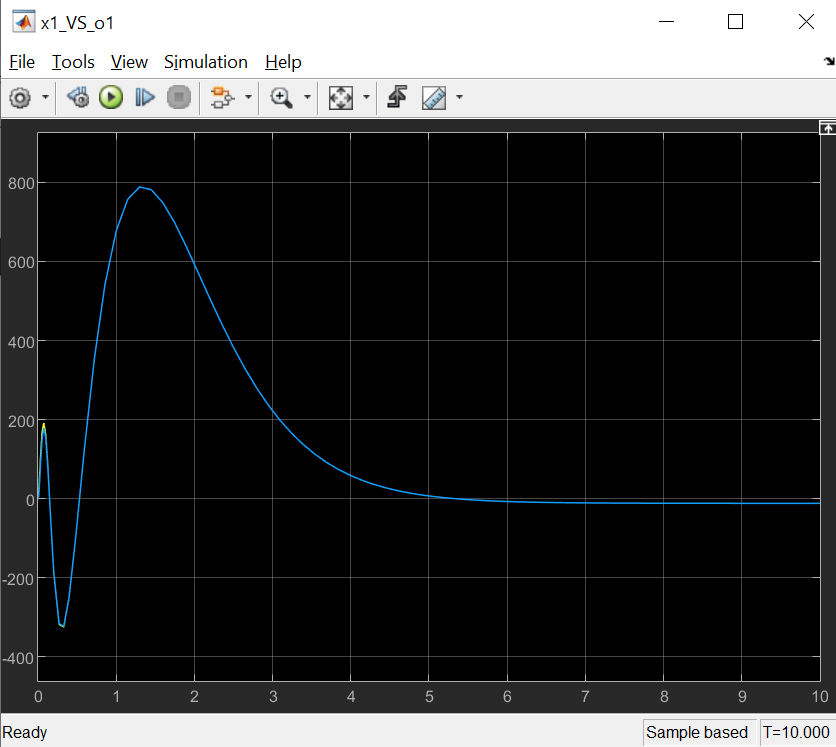


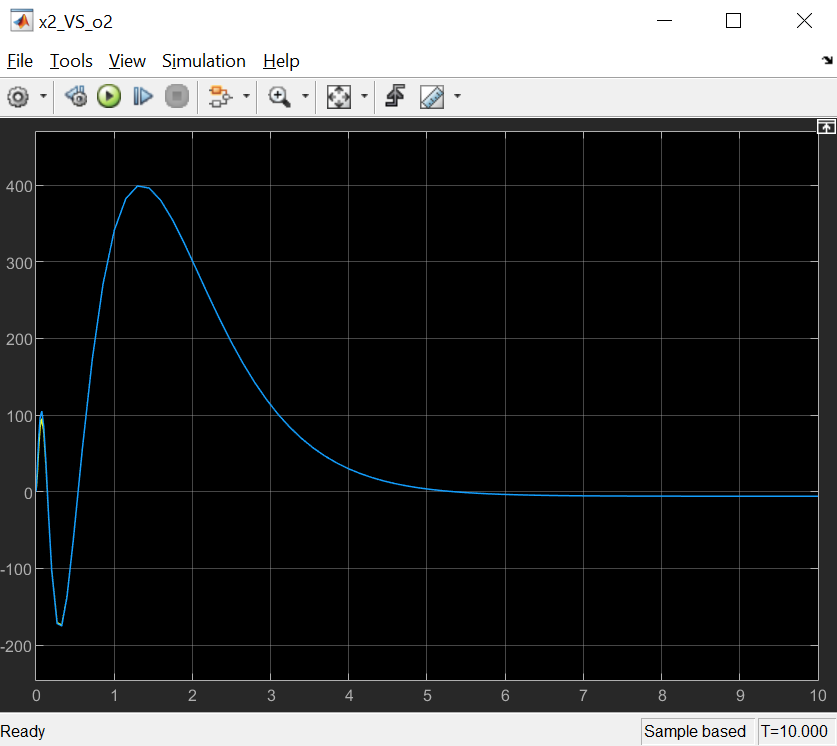


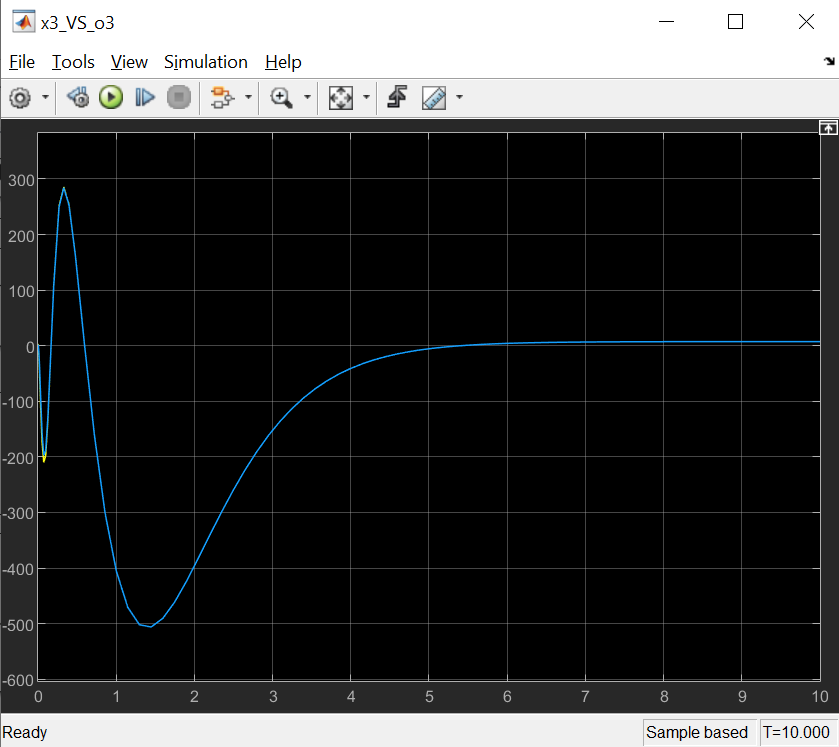






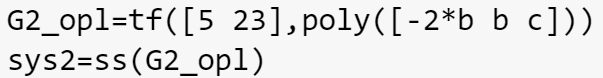


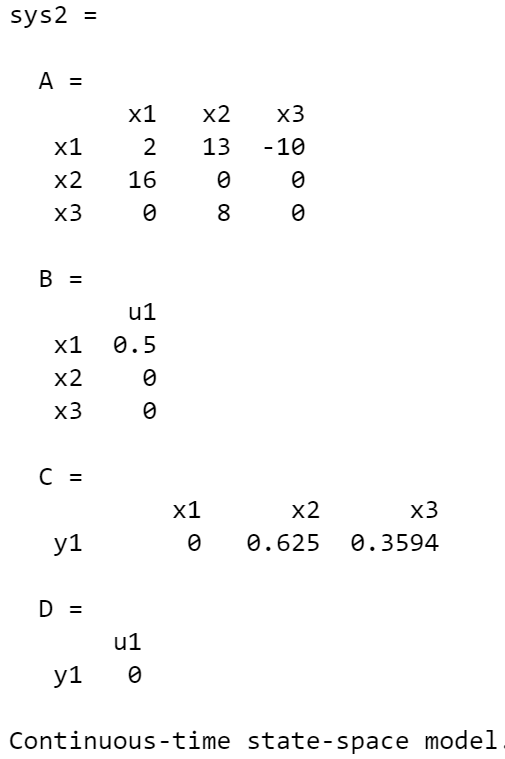




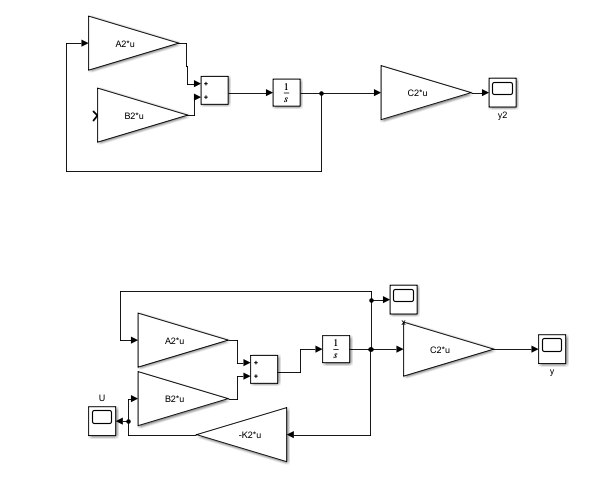
Exercise 2

To obtain the state-space model



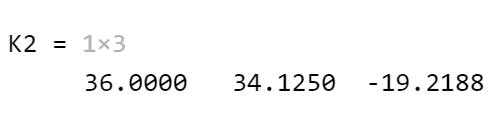


Simulink Model

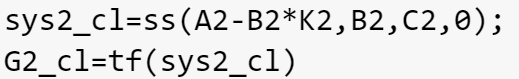


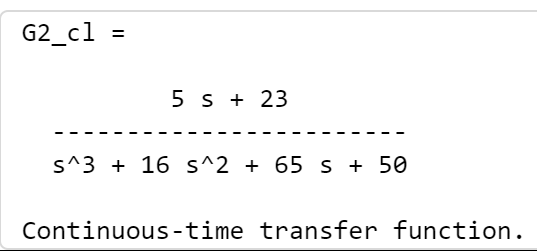
To obtain K



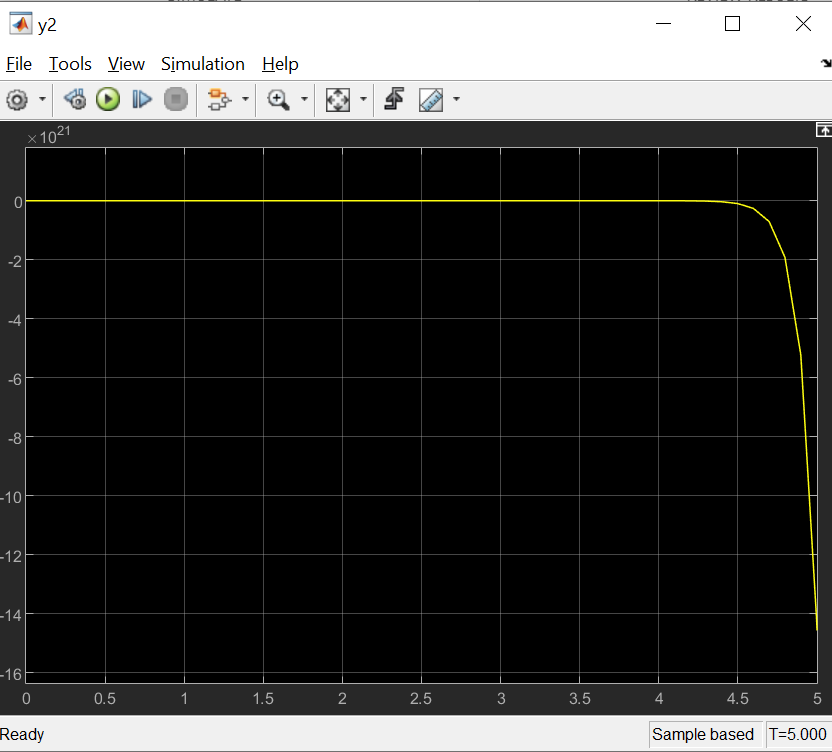


The transfer function

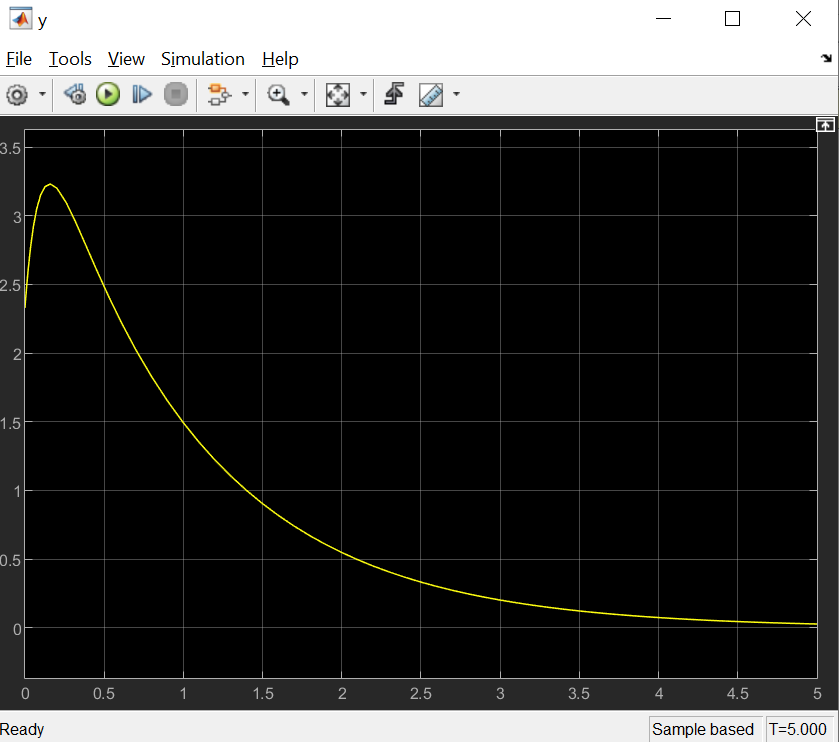




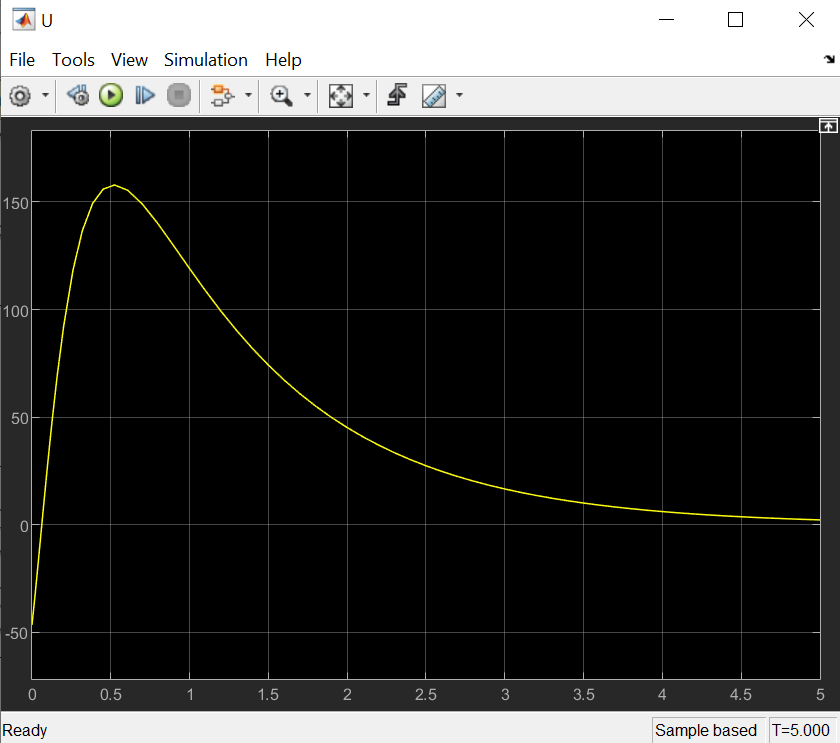
Output in open loop

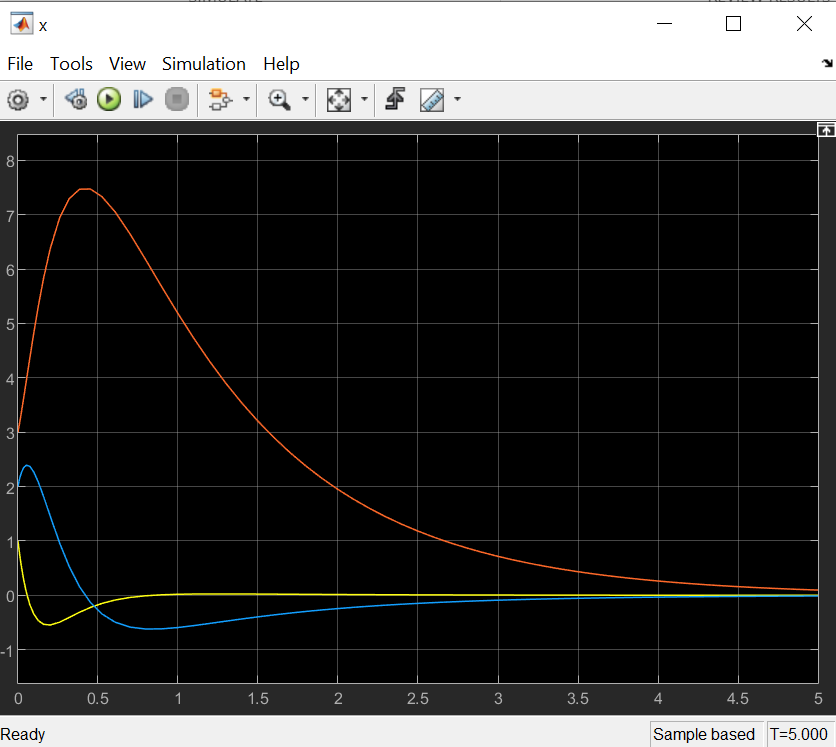


Output in close loop



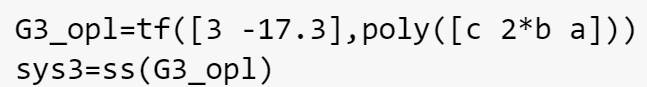
Input to the plant and state variables in close loop

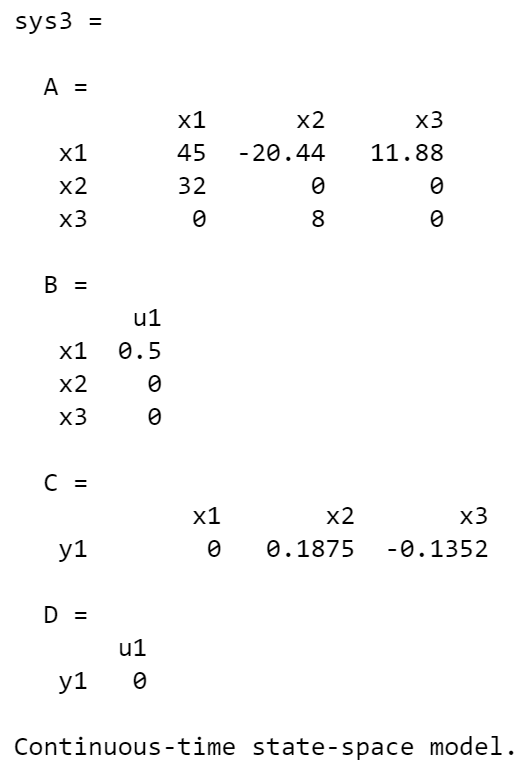




Exercise 3

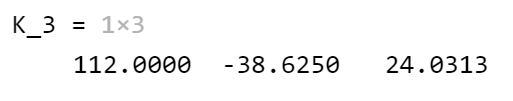
To obtain state-space model





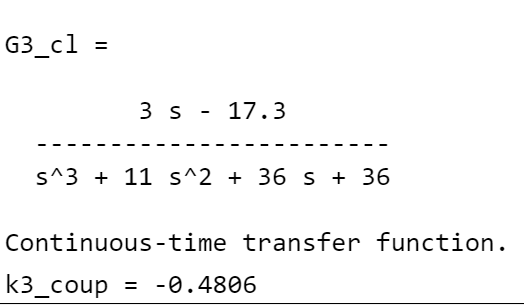
To obtain K



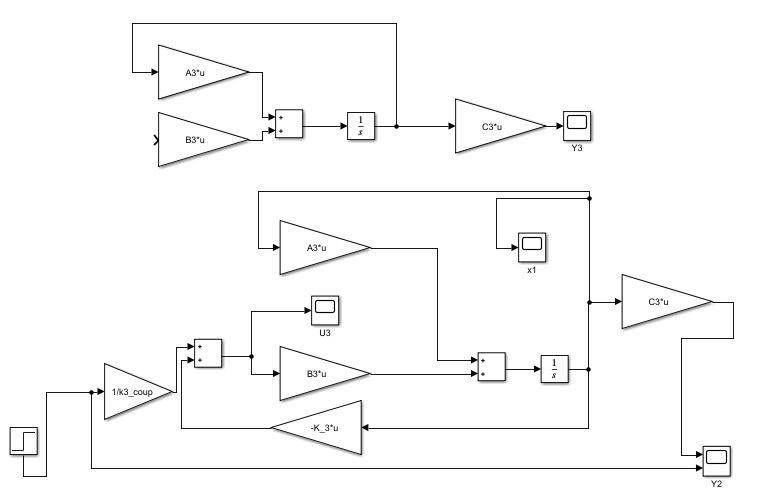


To obtain v

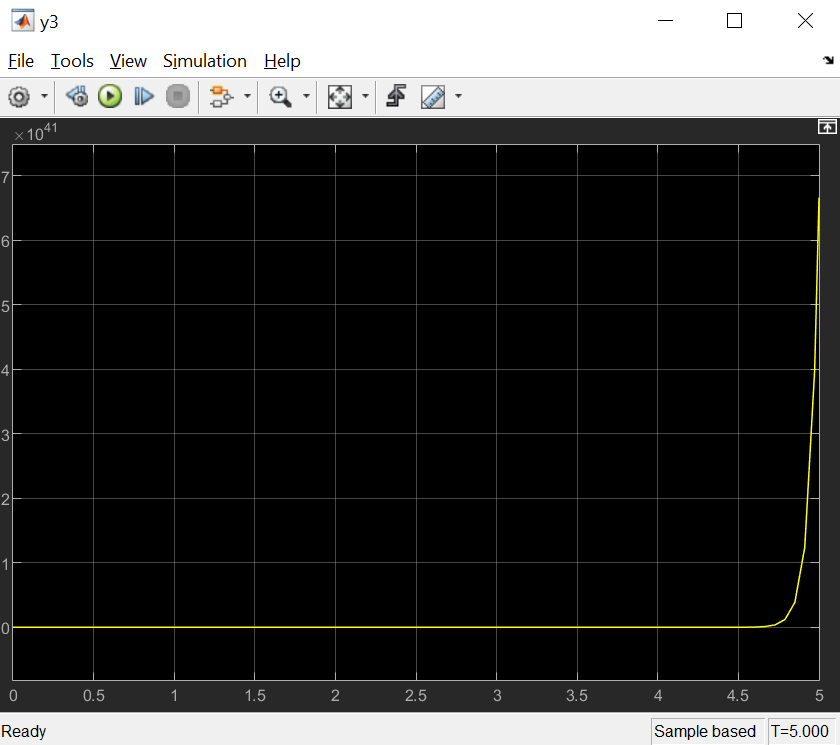




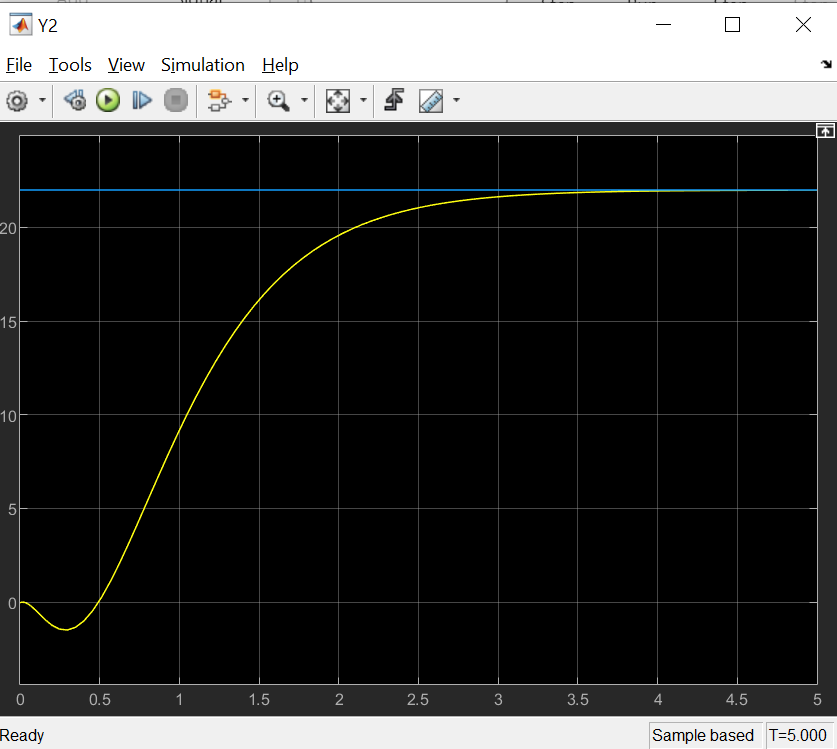
The Simulink model is the following



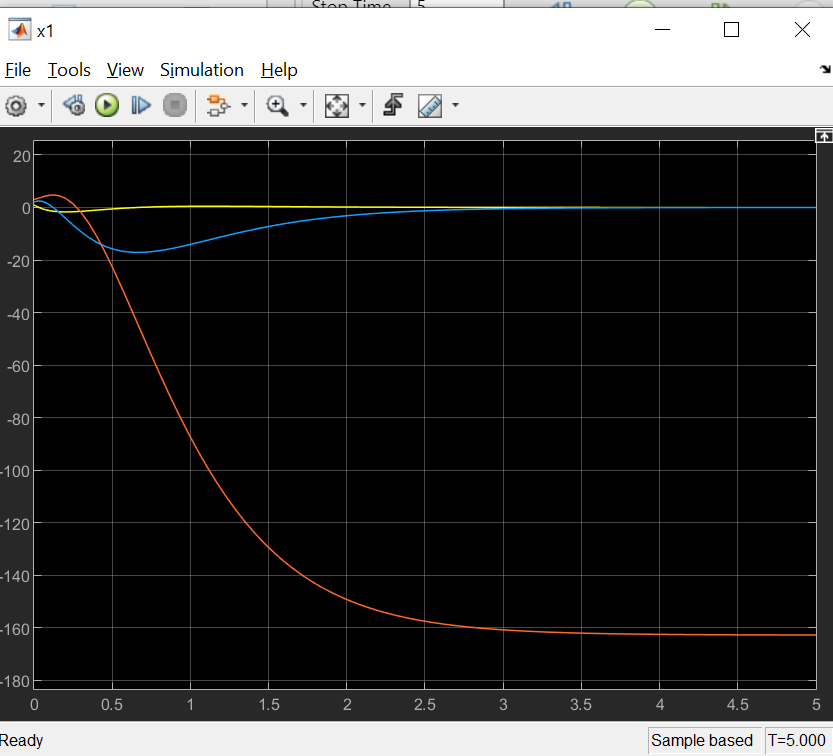
Outuput in open loop



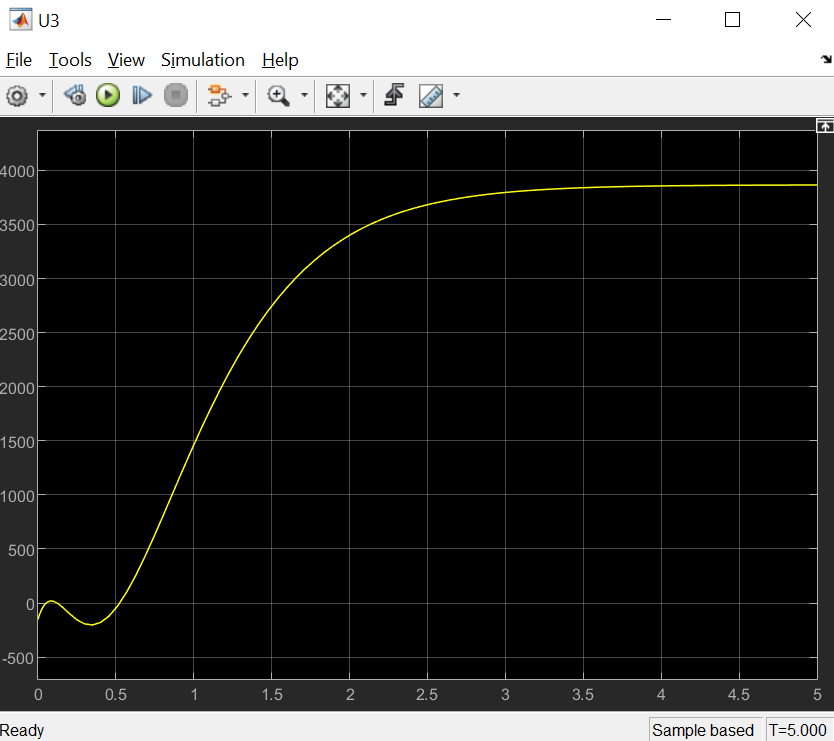
Output in close loop



Satate variables in close loop

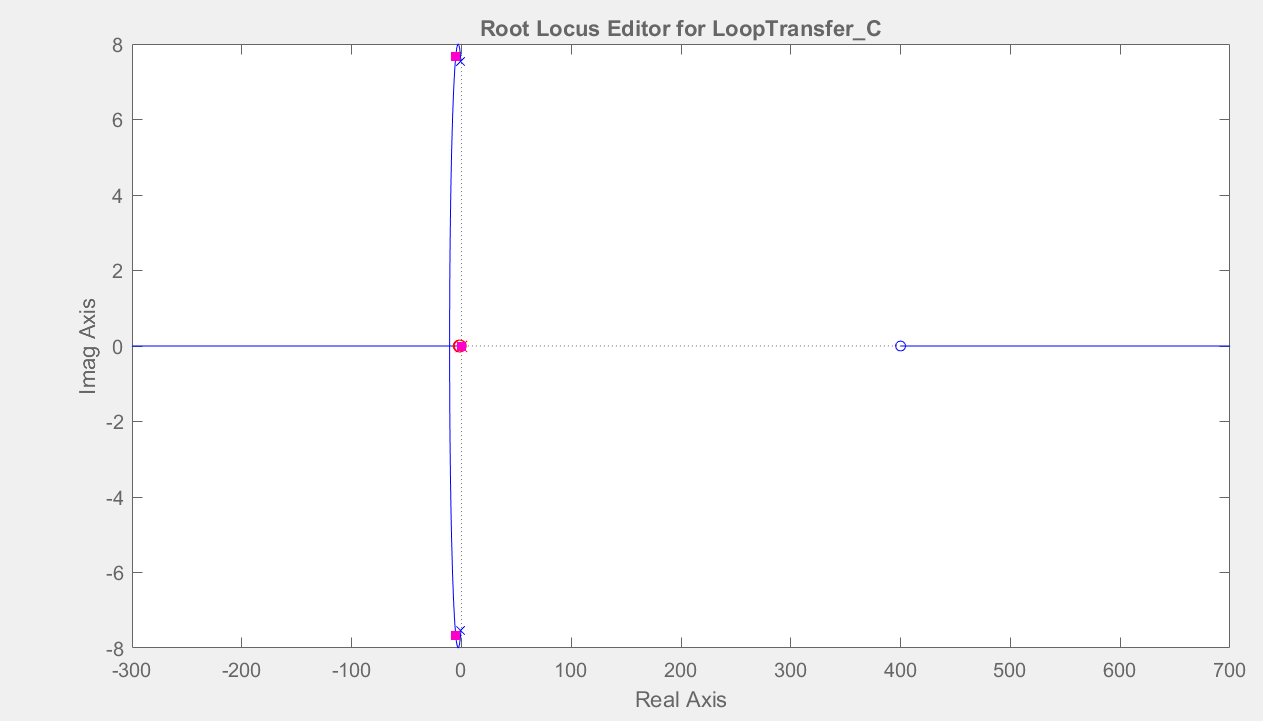


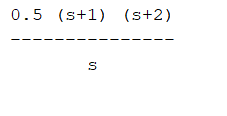
Input

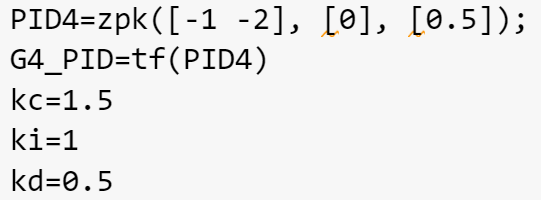


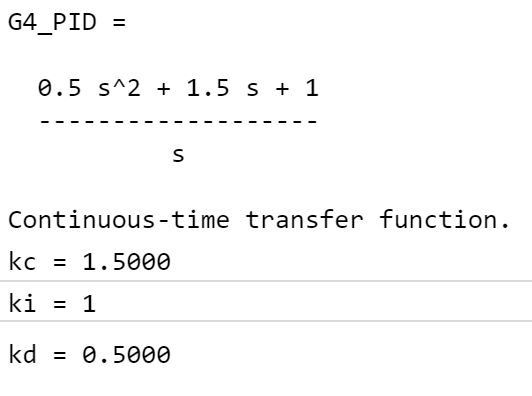
Exercise 4

Using algebraic method with help of sisotool

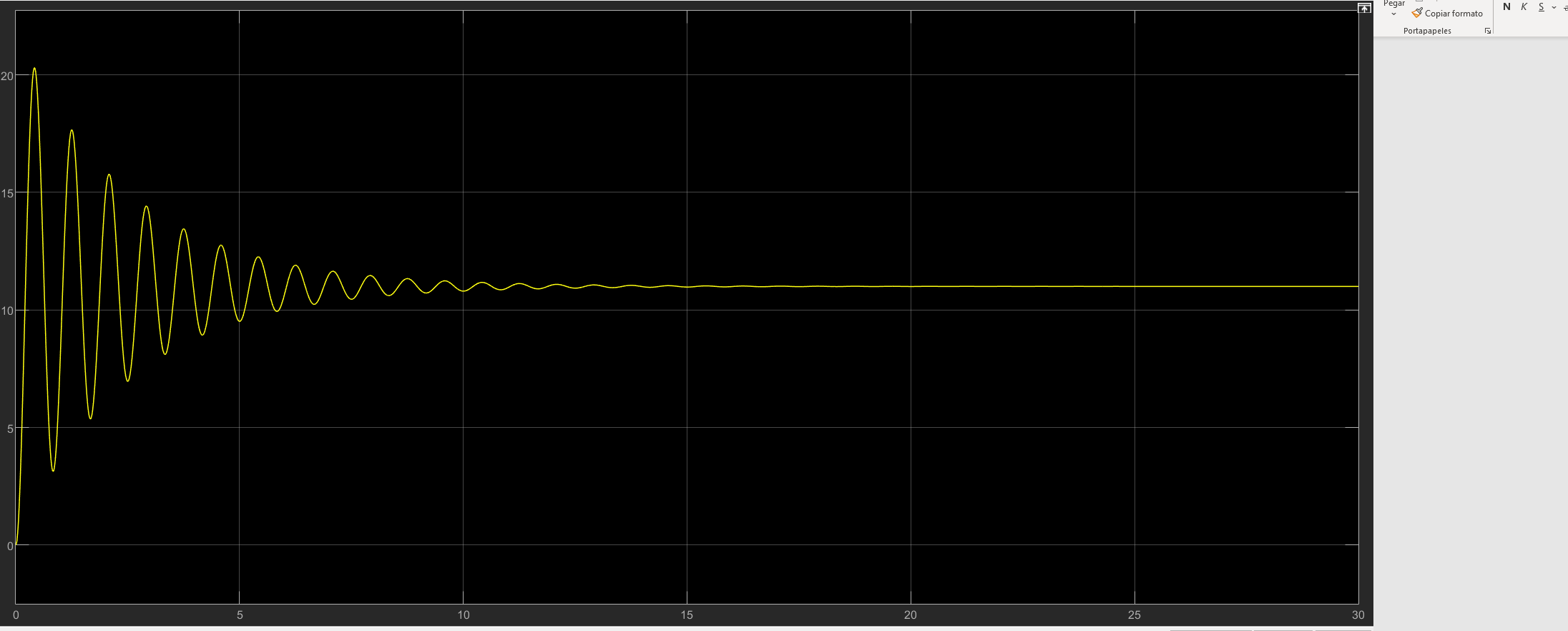




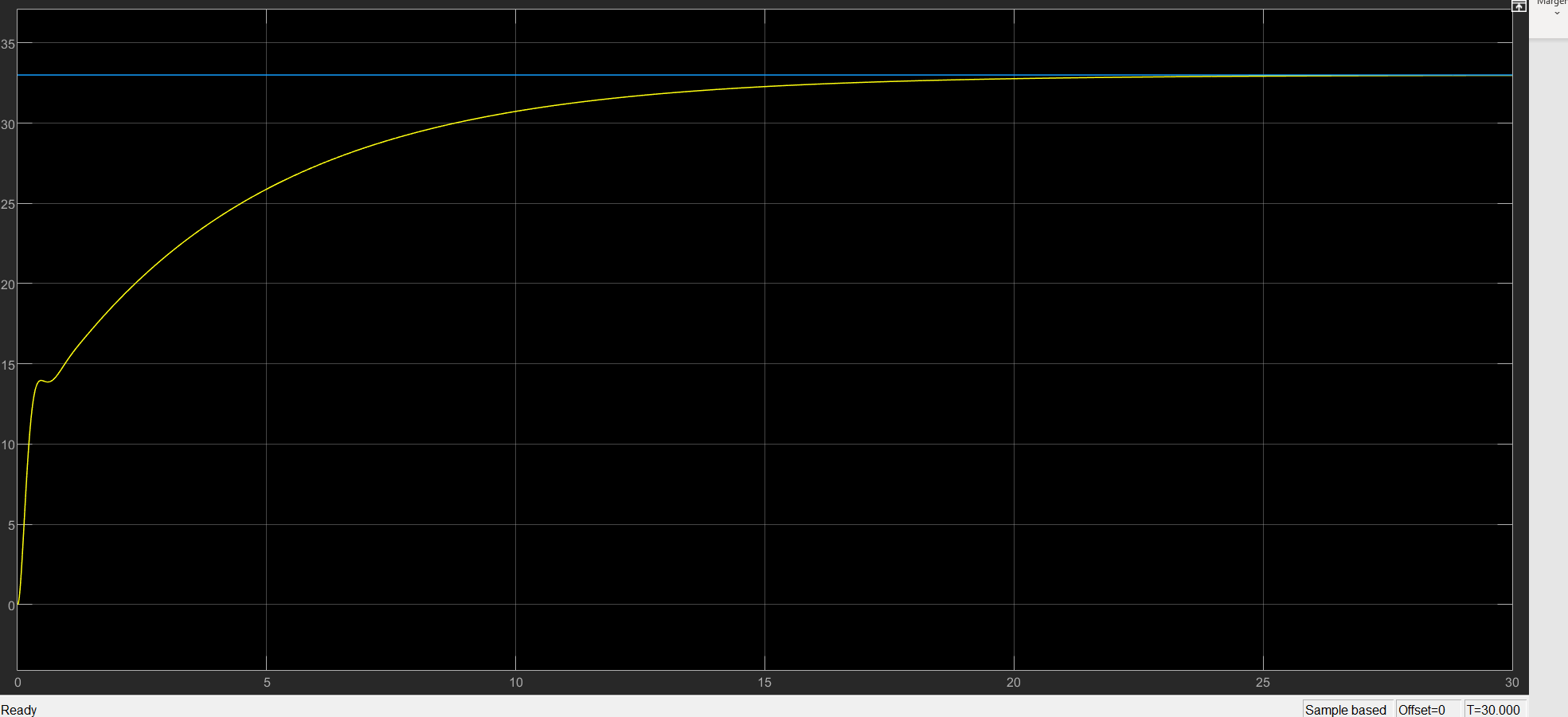




Output in open loop



Output in close loop with comparison with reference



Controller signal

