PART II - Matlab Excercises

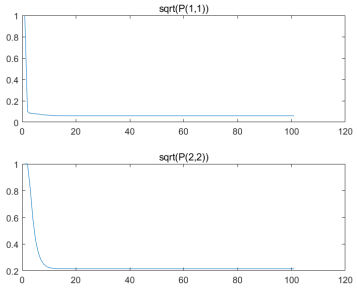
Question 1

According to the question:

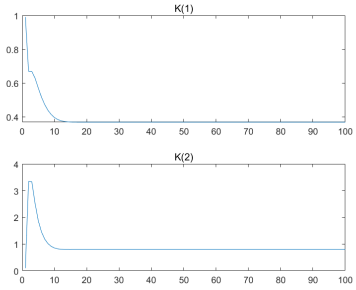
Question 2

variables	roles/usages
x	The actual state of the system
xhat	The estimated state
P	Covariance matrix of estimated state
G	Identity matrix for dimension consistency
D	Identity matrix for dimension consistency and it is 1
Q	Covariance of white Gaussian Noise in measurement
R	Covariance of white Gaussian Noise in process of state transition
wStdP	Standard deviation for noise on simulated position
wStdV	Standard deviation for noise on simulated velocity
vStd	Standard deviation Simulated measurement noise on position
u	Control signal (acceleration in this case)
PP	The set of covariances of all estimated state

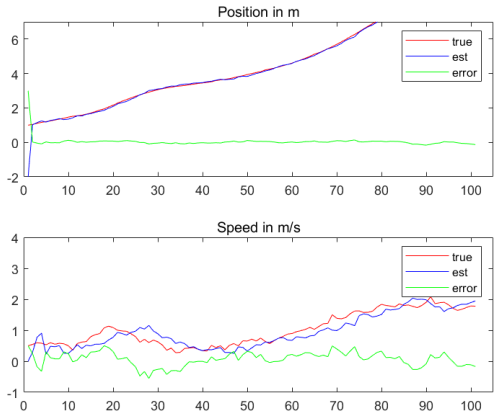
Question 3



(a) Estimated error covariance.

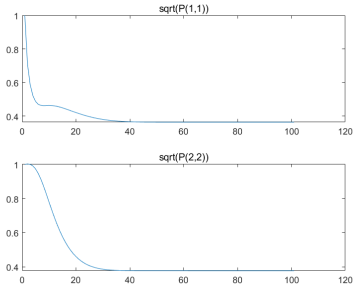


(b) Kalman filter gain coefficients.

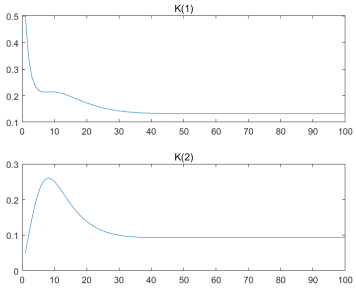


(c) Position in m.

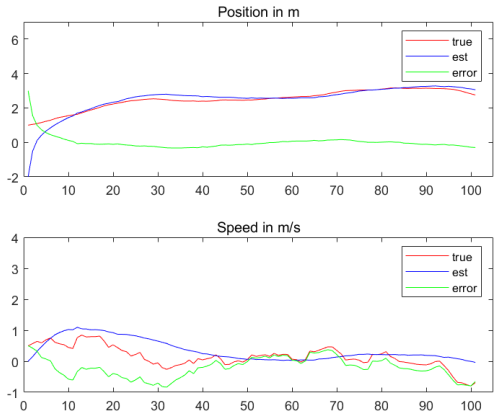
Figure 1: Default case with original Q and R



(a) Estimated error covariance.



(b) Kalman filter gain coefficients.



(c) Position in m.

Figure 2: Default case with original Q and R