

Øv 7

Opdreg

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19



$$c^1 \quad P = Q + A^T P (I + B R^{-1} B^T P)^{-1} A$$

$$(S + U T V)^{-1} = S^{-1} - S^{-1} U (T^{-1} + V S^{-1} U)^{-1} V S^{-1}$$

$$(I + B R^{-1} B^T P)^{-1} \Rightarrow S = I, U = B, T = B R^{-1} B^T, R = V$$

$$\Rightarrow I - B (B^T R B + P B)^{-1} P$$

$$\Rightarrow P = Q + A^T P A - A^T P B (B^T R B + P B)^{-1} P A$$



$$2) K = [1,0375 \quad 1,6498]$$

the observer

0,867 ± 0,05

$$b) K = [1,0375 \quad 1,6498]$$

the observer is a bit  
kinda off at first,  
but it quickly goes  
to the actual state.  
logically, the observed  
 $x_1$  is better estimated  
than  $x_2$ .

The controller makes  
all  $q = 0$  or  $0$ .

$$c) \quad \Phi = \begin{bmatrix} 1 & 0,1 & 0 & 0 \\ -0,2 & 0,7 & 0,1 & 0,2 \\ 0 & 0 & -0,9 & 1 \\ 0 & 0 & -1,9 & -1 \end{bmatrix}$$

$$\text{poles} = 0,867 \pm 0,05i \\ -0,947 \pm 1,3775i$$



3b) To find the figure  
from 3a and  
~~3b~~ 3b identical.  
But logically, it  
should be better  
to controlling the  
when not using  
an observer.  
Cause then you  
get less error  
sources.

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4 a)  $P = \begin{bmatrix} 27,517 & 7,27 \\ 7,27 & 10,23 \end{bmatrix}$

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b) ~~8~~ No answer

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