Consider a unity feedback control system with Gc(s)=K and R(s)=0 for inverted pendulum (example 3.3) in textbook.

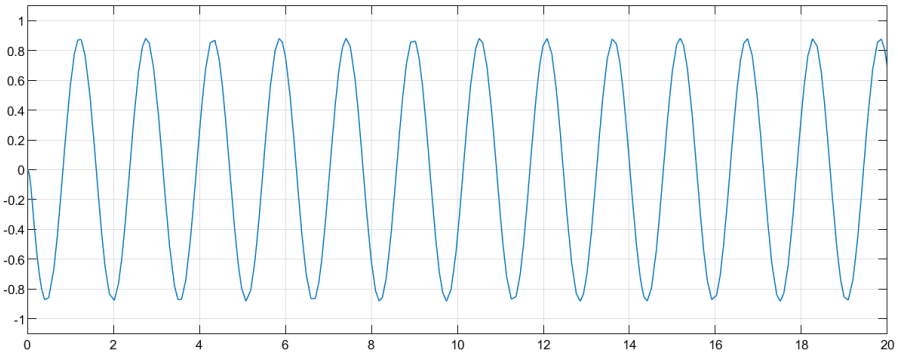
Analyze C1 = [0,0,1,0], C2 = [0,0,1,1], and C3 = [0,1,1,1] and different K.

$$A = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & -\frac{mg}{M} & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & \frac{g}{l} & 0 \end{bmatrix}, B = \begin{bmatrix} 0 \\ \frac{1}{M} \\ 0 \\ -\frac{1}{Ml} \end{bmatrix}$$

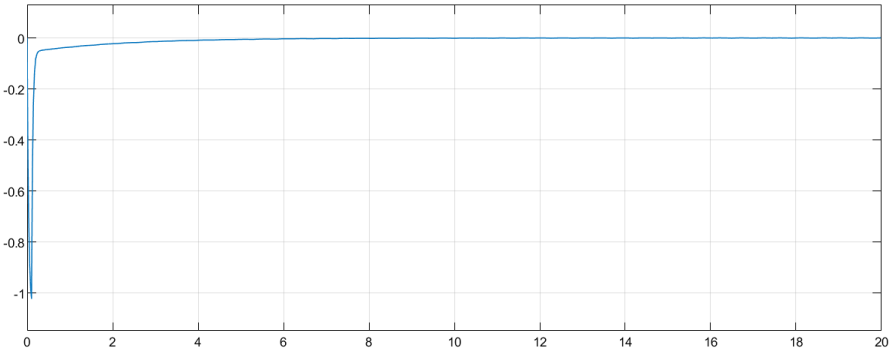
$$\dot{x}(t) = Ax(t) + Bu(t), y(t) = Cx(t) + Du(t)$$

1) use Simulink to simulate the output response for different K in s-domain.

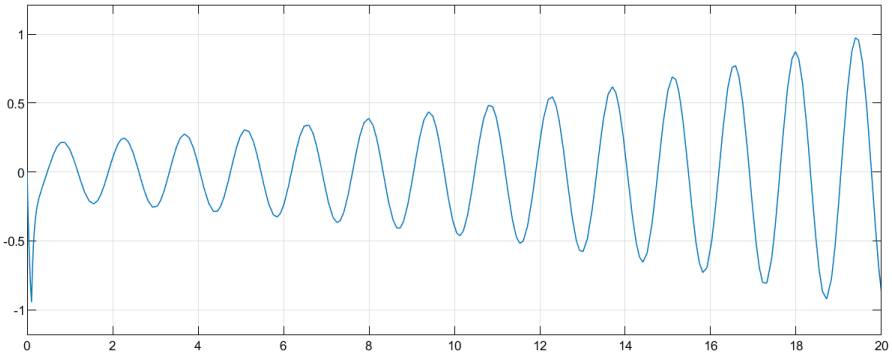
- For K = -36,
  - C = C1 = [0,0,1,0]



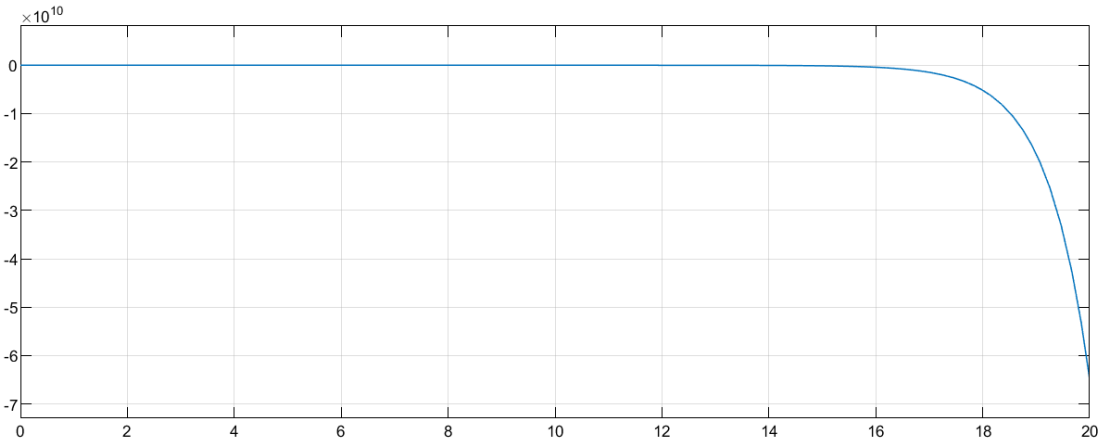
  - C = C2 = [0,0,1,1]



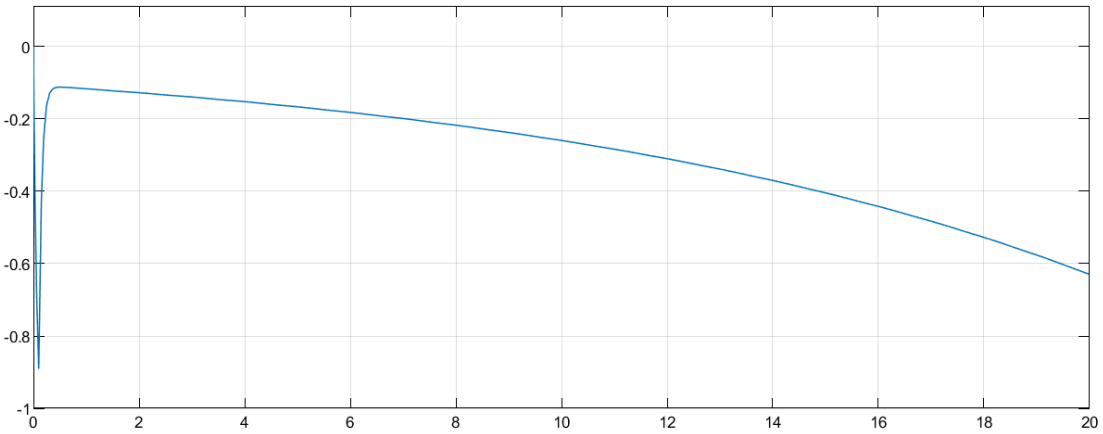
  - C = C3 = [0,1,1,1]



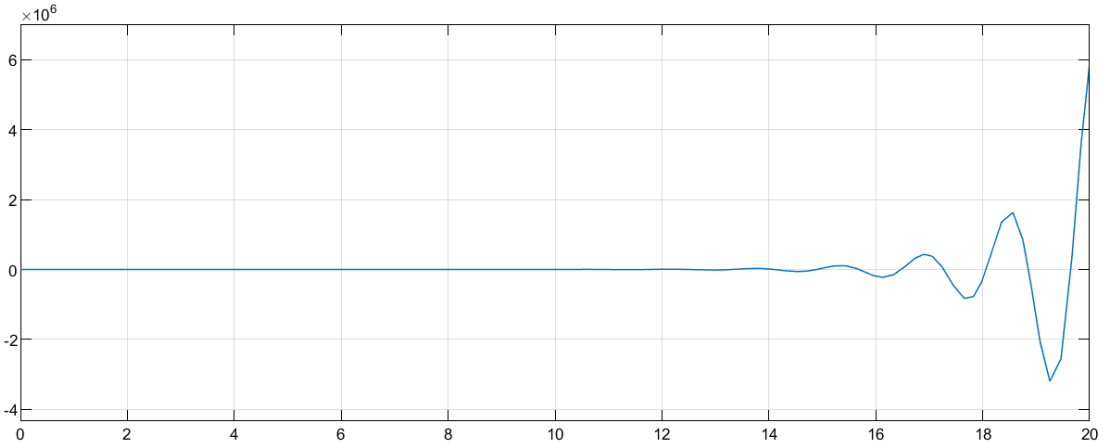
- For K = -18,
  - C = C1 = [0,0,1,0]



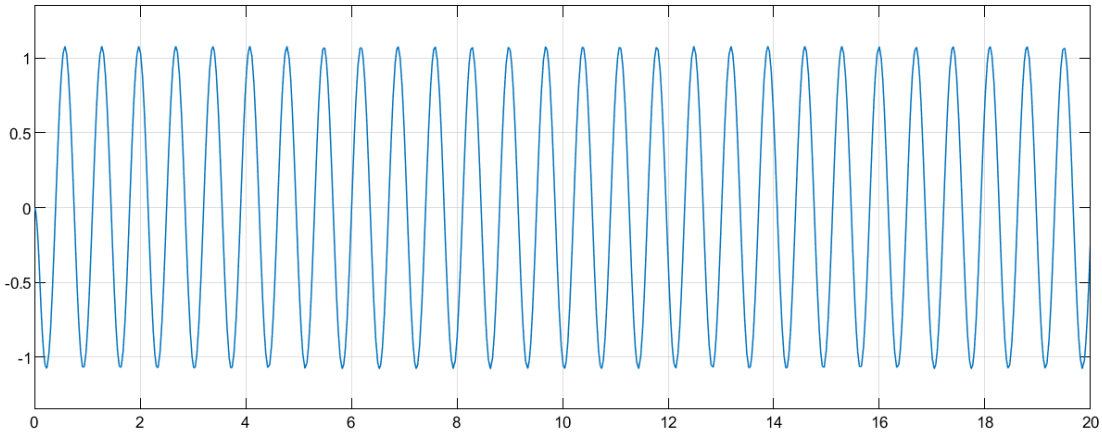
  - C = C2 = [0,0,1,1]



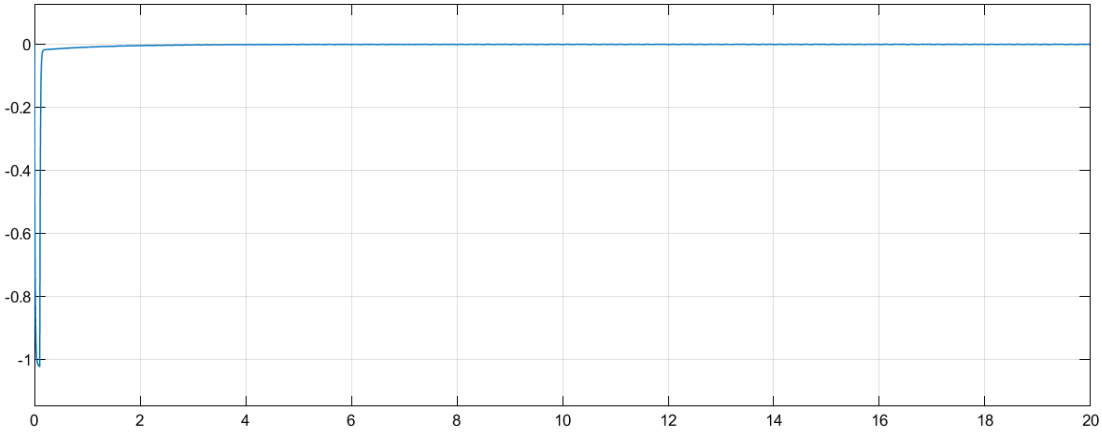
  - C = C3 = [0,1,1,1]



- For K = -100,
  - C = C1 = [0,0,1,0]



  - C = C2 = [0,0,1,1]



  - C = C3 = [0,1,1,1]