a)

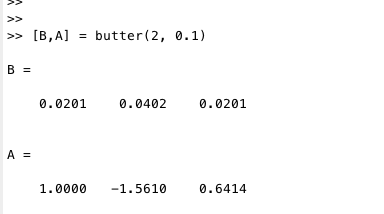
[B,A] = butter(N,Wn)

where N means Nth order lowpass digital Butterworth filter, and Wn means the cutoff frequency.

In this question, we use second order Butterworth filter, so N = 2.

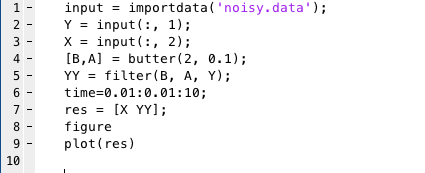
Sampling frequency is 100Hz, and cutoff frequency is 5Hz, so Wn = 5/(100/5) = 0.1.

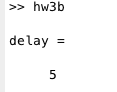
Thus, [B,A] = butter(2, 0.1)



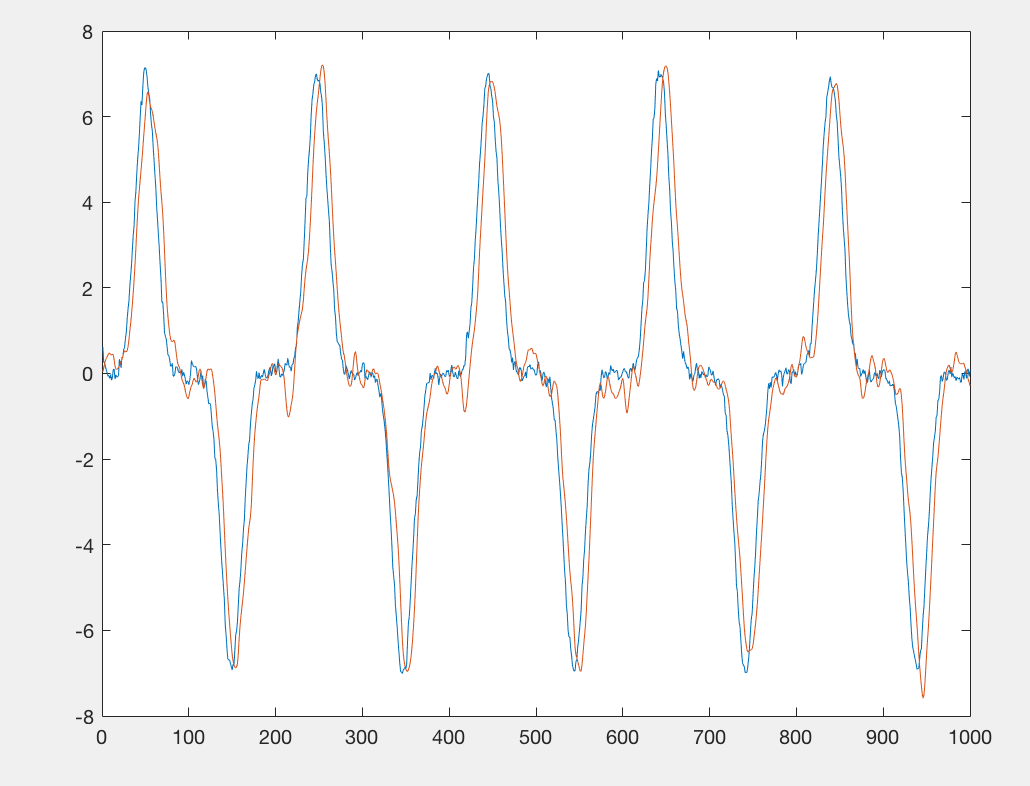
b1 = 0.0201 b2 = 0.0402 b3 = 0.0201 a2 = -1.5610 a3= 0.6414

b)

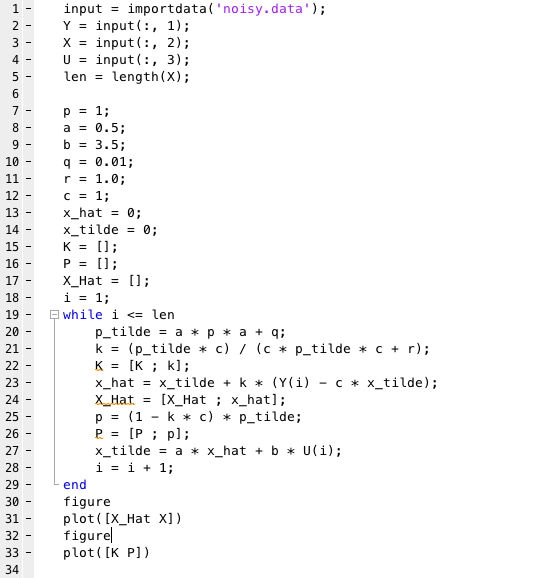


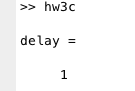


delay is 5



c)





delay is 1

