577b Lab4 Part2

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Part II

a) From the results of part I.c what can you tell about the order of the linear model (L)?

Rho_x1y_0 =0.856669640138319
Rho_x1y_1 =0.214265842308172
Rho_x1y_2 =-0.0858255325240054 # L = 2
Rho_x1y_3 =-6.44183960418615e-05 # much smaller
Rho_x1y_4 =-0.000428340882454559 # much smaller
Rho_x1y_5 =-5.81429670220233e-05 # much smaller

Rho_x2y_0 =0.120401208861281
Rho_x2y_1 =0.0116102118334772 # L = 1
Rho_x2y_2 =-7.72570623004785e-05 # much smaller
Rho_x2y_3 =0.000616648568871771 # much smaller
Rho_x2y_4 =-9.32147823591847e-05 # much smaller
Rho_x2y_5 =-0.00034746564660207 # much smaller

Approximately L = 2

b) Use a least square estimator to estimate paramters alpha and beta

a0 = 9.998 b0 = 1.003
a1 = 2.502 b1 = 0.100
a2 = -1.001 b2 = -0.002

If further roud up

a0 = 10 b0 = 1
a1 = 2.5 b1 = 0.1
a2 = -1 b2 = 0

c) What is the relationship between results of part I.c and part II.b?

They are consistent.
In I.c, we infer y(k) is related to x2(k) and x2(k-1), and is not related to x2(k-2). In II.b, the results show beta2 is really close to zero, which supports the I.c conclusion.
It's the same story on y and x1 if we got alpha3.
And the proportion also matches
for x1
0.856 : 0.214 : 0.086 = 9.998 : 2.502 : 1.001
for x2
0.120 : 0.012 = 1.003 : 0.100

d) Use your estimations from II.b to find mean and variance of error v(k).

mean : 0.05
variance: 25.98

Part III
error count = 342