

KFUPM - COMPUTER ENGINEERING DEPARTMENT

COE-587 –Performance Evaluation and Analysis

CSE-642 –Computer Systems Performance

Quiz03

Student Name:

Student Number:

a) Regression model:

Sum X = 56.000, Sum X² = 966.000, Mean X = 9.333

Sum Y = 14.000, Sum Y² = 49.882, Mean Y = 2.333

Sum X*Y = 217.860

Model: b0 = 0.498 - b1 = 0.197

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xi      yi      yi(model)  ei      ei^2
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1.000   0.650   0.694      -0.044  0.002
2.000   0.750   0.891      -0.141  0.020
4.000   1.360   1.284       0.076  0.006
8.000   2.260   2.071       0.189  0.036
16.000  3.590   3.645      -0.055  0.003
25.000  5.390   5.415      -0.025  0.001
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56.000  14.000  14.000      -0.000  0.067
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b) Computing the confidence intervals for b0 and b1:

SSE = 0.067, SST = 17.216, SSR = 17.149, R2 = 0.996 (R = 0.998)

MSE = 0.017, DF for errors = 4, Se = 0.129

std for b0 = 0.078, std for b1 = 0.006

confidence level = 90.0%, t-quantile = 2.1318

Conf interval for b0 = (0.332, 0.664)

Conf interval for b1 = (0.184, 0.210)

Note both parameters are significant (i.e. not zero) at this confidence level. Therefore, the hypothesis that all model parameters are equal to zero cannot be accepted.

c) Correlation coefficient between the two columns of data is $R = \sqrt{\frac{SSR}{SST}} = 0.998$. If the assumed linear relation between the two columns of data is correct (which is the basis for the linear regression model), then the correlation is expected to be HIGH. For our problem it is 0.998.