Econometrics partial Exam, January 31st, 2005, group 04
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I. Consider the following model

$$y_i = \beta_1 + \beta_2 x_{i2} + \beta_3 x_{i3} + \varepsilon_i$$

where $i = 1, 2, ...100$;i ε_i satisfies the classical assumptions. The model represents the individual salary as a function of years of education and years of experience. The model can be expressed in matrix notation as:

$$y = X\beta + \varepsilon$$

1. (1 punt) Write the contens of every vector and matrix of this case. Indicate the dimensions.

2. (1 punt) Derive the OLS estimator for the general case from the minimization of the sum of the squares of the residuals.

3. (1 punt) How would you calculate the vector of residuals of this model?

4. (2 punts) How would you do a significance test for every coefficient of the model? Show the details: 1) the hypothesis 2) the formula for the test statistic and how would you obtain the values that enter in the formula and 3) the regions of acceptance/rejection.

5. (2 punts) How would you calculate the goodness of fit?

6. (2 punts) Explain step by step how would you test the hypothesis of $\beta_2 = \beta_3$ using the substitution method. Also you have to expalin in detail how would you perform the test.

7. (5 punts) Consider now that you want to test together with the restriction in question 6 that $\beta_2 + \beta_3 = 1$. Explain in detail how would you perform the test if you want to do it **from the unrestricted model**.