

List 02. Regression Fitting

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1 Regression fitting

#1. For the dataset `sleep75` consider a regression

`sleep` on `totwrk` & `age`.

1. write down the specification
2. Evaluate matrices of regression design \mathbf{y}, \mathbf{X}
3. Evaluate coefficients of the fitted model via solving a system of linear equations
4. Evaluate coefficients of the fitted model via regression specification (`.ols` method from `statsmodels`)
5. Evaluate coefficients of the fitted model via matrices of regression design (`.OLS` method from `statsmodels`)

#2. For the dataset `sleep75` consider a regression

`sleep` on `totwrk`, `age`, `age`².

1. write down the specification
 2. Evaluate matrices of regression design \mathbf{y} , \mathbf{X}
 3. Evaluate coefficients of the fitted model via solving a system of linear equations
 4. Evaluate coefficients of the fitted model via regression specification (.ols method from statsmodels)
 5. Evaluate coefficients of the fitted model via matrices of regression design (.OLS method from statsmodels)
- #3. For the dataset `sleep75` consider a regression

`sleep/60` on `totwrk/60`, `age`, `smsa`, `south`.

1. write down the specification
 2. Evaluate matrices of regression design \mathbf{y} , \mathbf{X}
 3. Evaluate coefficients of the fitted model via solving a system of linear equations
 4. Evaluate coefficients of the fitted model via regression specification (.ols method from statsmodels)
 5. Evaluate coefficients of the fitted model via matrices of regression design (.OLS method from statsmodels)
- #4. For the dataset `Labour` consider a regression

`log(output)` on `log(capital)`, `log(labour)`.

1. write down the specification
2. Evaluate matrices of regression design \mathbf{y} , \mathbf{X}
3. Evaluate coefficients of the fitted model via solving a system of linear equations
4. Evaluate coefficients of the fitted model via regression specification (.ols method from statsmodels)
5. Evaluate coefficients of the fitted model via matrices of regression design (.OLS method from statsmodels)

Data selection & Regression fitting

#5. For the dataset `sleep75` consider a regression

`sleep` on `totwrk`, `age`, `south`, `male`.

Fit the regression only for city dwellers (`smsa==1`).

#6. For the dataset `sleep75` consider a regression

`sleep` on `totwrk`, `age`, `south`, `smsa`.

Fit the regression only for men (`male==1`).

#7. For the dataset `sleep75` consider a regression

`sleep` on `totwrk`, `age`, `south`, `smsa`.

Fit the regression only for women (`male==0`).

2 Coefficient interpretation

#1. For the dataset `sleep75` consider a regression

`sleep` on `totwrk`, `age`.

Fit the regression and give the interpretation of its coefficients.

#2. For the dataset `sleep75` consider a regression

`sleep` on `totwrk`, `age`, `male`, `smsa`, `south`.

Fit the regression and give the interpretation of its coefficients.

#3. For the dataset `wage2` consider a regression

`log(wage)` on `exper`, `IQ`.

Fit the regression and give the interpretation of its coefficients.

#4. For the dataset `wage2` consider a regression

`log(wage)` on `exper`, `IQ`, `south`, `urban`, `married`.

Fit the regression and give the interpretation of its coefficients.

#5. For the dataset `Labour` consider a regression

`log(output)` on `log(capital)`, `log(labour)`.

Fit the regression and give the interpretation of its coefficients.

#6. For the dataset `Labour` consider a regression

`log(output)` on `log(capital)`, `log(labour)`, `log(wage)`.

Fit the regression and give the interpretation of its coefficients.

3 Goodness-of-fit, Fitted values, Residuals

#1. For the dataset `sleep75` consider a regression

`sleep` on `totwrk`, `age`.

Fit the regression and calculate:

1. TSS, ESS, RSS
2. R^2, R^2_{adj}
3. Fitted values, dependent variable, residuals for observations with indices [0, 3, 78, 197, 401, 561]

Give the interpretation for obtained values (if possible)

#2. For the dataset `wage2` consider a regression

`log(wage)` on `age`, `IQ`, `urban`, `married`, `south`.

Fit the regression and calculate:

1. TSS, ESS, RSS
2. R^2, R^2_{adj}
3. Fitted values, dependent variable, residuals for observations with indices [5, 33, 82, 149, 392, 603]

Give the interpretation for obtained values (if possible)

#3. For the dataset `wage2` consider a regression

`log(wage)` on `age`, `IQ`, `urban`, `married`, `south`.

Fit the regression and calculate:

1. TSS, ESS, RSS
2. R^2, R^2_{adj}
3. Fitted values, dependent variable, residuals for observations with indices [7, 29, 43, 86, 124, 138]

Give the interpretation for obtained values (if possible)