

Exercise – Function – Least squares statistics

This function calculates OLS statistics. The input arguments of the function are y and X . y is a N by 1 vector, and X is an N by K matrix. The output argument of the function is `LSS`. It is a structure array that contains the calculated least squares statistics. The expression in line 14 is called the “mean squared error”. The expression in line 15 is the estimator of the standard deviation of the regression error. It is called the standard error of the regression. It is also referred to as the “root mean squared error”. Line 17 is the variance-covariance estimator of the OLS estimator.

```
3 function LSS = exercisefunctionlss(y,X)
4 %% Number of observations and column dimension of X
5 LSS.N          = length(y);
6 LSS.K          = size(X,2);
7 %% Coefficient estimates, predictions, residuals
8 LSS.B_hat      = (X'*X)\X'*y; % Or inv(X'*X)*X'*y;
9 LSS.y_hat      = X*LSS.B_hat;
10 LSS.u_hat      = y-LSS.y_hat;
11 %% Residual sum of squares
12 LSS.RSS        = LSS.u_hat'*LSS.u_hat;
13 %% The estimator of the variance of the regression error
14 LSS.sigma_hat_squared = LSS.RSS/(LSS.N-LSS.K);
15 LSS.sigma_hat   = sqrt(LSS.sigma_hat_squared);
16 %% The variance-covariance estimator of the OLS estimator
17 LSS.B_hat_VCE   = LSS.sigma_hat_squared.*inv(X'*X);
18 LSS.B_hat_SEE   = sqrt(diag(LSS.B_hat_VCE));
19 end
```