NDK_CHOWTEST

Last Modified on 04/20/2016 12:31 pm CDT

- C/C++
- .Net

```
int __stdcall NDK_CHOWTEST(double **      XX1,
                           size_t         M,
                           double *       Y1,
                           size_t         N1,
                           double **      XX2,
                           double *       Y2,
                           size_t         N2,
                           LPBYTE         mask,
                           size_t         nMaskLen,
                           double         intercept,
                           TEST_RETURN    retType,
                           double *       retVal
                          )
```

Returns the p-value of the regression stability test (i.e. whether the coefficients in two linear regressions on different data sets are equal).

Returns

status code of the operation

Return values

NDK_SUCCESS Operation successful

NDK_FAILED Operation unsuccessful. See Macros for full list.

Parameters

[in]	**XX1**	is the independent variables data matrix of the first data set (two dimensional).
[in]	**M**	is the number of variables (columns) in XX1 and XX2.
[in]	**Y1**	is the response or the dependent variable data array for the first data set (one dimensional array).
[in]	**N1**	is the number of observations (rows) in the first data set.
[in]	**XX2**	is the independent variables data matrix of the second data set, such that each column represents one variable.
[in]	**Y2**	is the response or the dependent variable data array of the second data set (one dimensional array).
[in]	**N2**	is the number of observations (rows) in the second data set.
[in]	**mask**	is the boolean array to select a subset of the input variables in X. If NULL, all variables in X are included.
[in]	**nMaskLen**	is the number of elements in the mask, which must be zero or equal to M.
[in]	**intercept**	is the regression constant or the intercept value (e.g. zero). If missing, an

intercept is not fixed and will be computed from the data set.

[in] **retType** is a switch to select the return output

Method	Value	Description
TEST_PVALUE	1	P-Value
TEST_SCORE	2	Test statistics (aka score)
TEST_CRITICALVALUE	3	Critical value.

[in] **retVal** is the calculated Chow test statistics.

Remarks

- The data sets may include missing values.
- Each column in the explanatory (predictor) matrix corresponds to a separate variable.
- Each row in the explanatory matrix and corresponding dependent vector correspond to one observation.
- Observations (i.e. row) with missing values in X or Y are removed.
- Number of observation of each data set must be larger than the number of explanatory variables.
- In principle, the Chow test constructs the following regression models:
  - Model 1 (Data set 1): $$y_t = \alpha_1 + \beta_{1,1}\times X_1 + \beta_{2,1}\times X_2 + \cdots + \epsilon$$
  - Model 2 (Data set 2): $$y_t = \alpha_2 + \beta_{1,2}\times X_1 + \beta_{2,2}\times X_2+ \cdots + \epsilon$$
  - Model 3 (Data sets 1 + 2): $$y_t = \alpha + \beta_1\times X_1 + \beta_2 \times X_2 + \cdots + \epsilon$$
- The Chow test hypothesis:

  $$ H_{o}= \left\{\begin{matrix} \alpha_1 = \alpha_2 = \alpha \\ \beta_{1,1} = \beta_{1,2} = \beta_1 \\ \beta_{2,1} = \beta_{2,2} = \beta_2 \end{matrix}\right. $$ $$H_{1}: \exists \alpha_i \neq \alpha, \exists \beta_{i,j} \neq \beta_i$$

  Where:
  - $$H_{o}$$ is the null hypothesis.
  - $$H_{1}$$ is the alternate hypothesis.
  - $$\beta_{i,j}$$ is the i-th coefficient in the j-th regression model (j=1,2,3).
- The Chow statistics are defined as follows: $$\frac{(\mathrm{SSE}_C - (\mathrm{SSE}_1+\mathrm{SSE}_2))/(k)}{(\mathrm{SSE}_1+\mathrm{SSE}_2)/(N_1+N_2-2k)}$$

  Where:
  - $$\mathrm{SSE}$$ is the sum of the squared residuals.
  - $$K$$ is the number of explanatory variables.
  - $$N_1$$ is the number of non-missing observations in the first data set.
  - $$N_2$$ is the number of non-missing observations in the second data set.
- The Chow test statistics follow an F-distribution with $$k$$, and $$N_1+N_2-2\times K$$ degrees of freedom.

Requirements

Header	SFSDK.H
Library	SFSDK.LIB
DLL	SFSDK.DLL

Examples

```
int NDK_CHOWTEST(ref UIntPtr     XX1,
                 UIntPtr         M,
                 double[]        Y1,
                 UIntPtr         N1,
                 ref UIntPtr     XX2,
                 double[]        Y2,
                 UIntPtr         N2,
                 Byte[]          mask,
                 UIntPtr         nMaskLen,
                 double          intercept,
                 TEST_RETURN     retType,
                 ref double      retVal
                )
```

Namespace: NumXLAPI
Class: SFSDK
Scope: Public
Lifetime: Static

Returns the p-value of the regression stability test (i.e. whether the coefficients in two linear regressions on different data sets are equal).

Returns

status code of the operation

Return values

NDK_SUCCESS Operation successful
NDK_FAILED Operation unsuccessful. See Macros for full list.

Parameters

[in]**XX1** is the independent variables data matrix of the first data set (two dimensional).
[in]**M** is the number of variables (columns) in XX1 and XX2.
[in]**Y1** is the response or the dependent variable data array for the first data set (one

dimensional array).

[in] **N1** is the number of observations (rows) in the first data set.

[in] **XX2** is the independent variables data matrix of the second data set, such that each column represents one variable.

[in] **Y2** is the response or the dependent variable data array of the second data set (one dimensional array).

[in] **N2** is the number of observations (rows) in the second data set.

[in] **mask** is the boolean array to select a subset of the input variables in X. If NULL, all variables in X are included.

[in] **nMaskLen** is the number of elements in the mask, which must be zero or equal to M.

[in] **intercept** is the regression constant or the intercept value (e.g. zero). If missing, an intercept is not fixed and will be computed from the data set.

[in] **retType** is a switch to select the return output

Method	Value	Description
TEST_PVALUE	1	P-Value
TEST_SCORE	2	Test statistics (aka score)
TEST_CRITICALVALUE	3	Critical value.

[in] **retVal** is the calculated Chow test statistics.

Remarks

- The data sets may include missing values.
- Each column in the explanatory (predictor) matrix corresponds to a separate variable.
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  - Model 3 (Data sets 1 + 2): $y_t = \alpha + \beta_1\times X_1 + \beta_2 \times X_2 + \cdots + \epsilon$
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  Where:
  - H_{o} is the null hypothesis.
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  - $\beta_{i,j}$ is the i-th coefficient in the j-th regression model (j=1,2,3).

- The Chow statistics are defined as follows: $$\frac{(\mathrm{SSE}_C - (\mathrm{SSE}_1+\mathrm{SSE}_2))/(k)}{(\mathrm{SSE}_1+\mathrm{SSE}_2)/(N_1+N_2-2k)}$$ Where:
  - SSE is the sum of the squared residuals.
  - K is the number of explanatory variables.
  - N_1 is the number of non-missing observations in the first data set.
  - N_2 is the number of non-missing observations in the second data set.
- The Chow test statistics follow an F-distribution with k, and $N_1+N_2-2\times K$ degrees of freedom.

Exceptions

Exception Type	Condition
None	N/A

Requirements

Namespace	NumXLAPI
Class	SFSDK
Scope	Public
Lifetime	Static
Package	NumXLAPI.DLL

Examples

References

Hamilton, J .D.; Time Series Analysis , Princeton University Press (1994), ISBN 0-691-04289-6

Tsay, Ruey S.; Analysis of Financial Time Series John Wiley & SONS. (2005), ISBN 0-471-690740

See Also

[template("related")]