NDK_LESMTH

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- C/C++
- .Net

```
int __stdcall NDK_LESMTH(double * pData,
                         size_t   nSize,
                         BOOL     bAscending,
                         double * alpha,
                         int      xlHorizon,
                         BOOL     bOptimize,
                         double * retVal
                        )
```

Returns the (Brown's) linear exponential smoothing estimate of the value of X at time T+m (based on the raw data up to time t).

Returns

status code of the operation

Return values

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

Parameters

[in] **pData** is the univariate time series data (a one dimensional array).

[in] **nSize** is the number of elements in pData.

[in] **bAscending** is the time order in the data series (i.e. the first data point's corresponding date (earliest date=1 (default), latest date=0)).

[in] **alpha** is the smoothing factor (alpha should be between zero and one (exclusive)). If missing or omitted, a value of 0.333 is used.

[in] **xlHorizon** is the forecast time horizon beyond the end of pData. If missing, a default value of 0 (latest or end of X) is assumed.

[in] **bOptimize** is a flag (True/False) for searching and using the optimal value of the smoothing factor. If missing or omitted, optimize is assumed false.

[out] **retVal** is the calculated value of this function.

Remarks

1. The Brown's Linear exponential smoothing function F_{T+m} is defined as:
$$S'_1 = X_1$$
$$S''_1 = X_1$$
$$S'_{t>1} = \alpha X_{t} + (1-\alpha)S'_{t-1}$$
$$S''_{t>1} = \alpha S'_{t} + (1-\alpha)S''_{t-1}$$
$$a_t = 2S'_t - S''_t$$
$$b_t = \frac{\alpha}{1-\alpha}\times (S'_t - S''_t)$$
$$F_{T+m} = a_T + m\times b_T$$
Where:
   - X_t is the value of the time series at time t.

- $\circ$ \(T\) is the time of the latest observation in the sample data.
- $\circ$ \(\alpha\) is the smoothing factor.
2. \(m\) is the estimate time/horizon (past the end of raw data).
3. To search for the optimal value of the smoothing factor (alpha), the time series must have two(2) or more non-missing observations.
4. The time series is homogeneous or equally spaced.
5. The time series may include missing values (e.g. NaN) at either end.

Requirements

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

Examples

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int NDK_LESMTH(double[]	pData,	**Namespace:** NumXLAPI

```
int NDK_LESMTH(double[]   pData,
               int        nSize,
               BOOL       bAscending,
               double *   alpha,
               int        xlHorizon,
               BOOL       bOptimize,
               ref double retVal
               )
```

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

Returns the (Brown's) linear exponential smoothing estimate of the value of pData at time T+m (based on the raw data up to time t).

Returns

status code of the operation

Return values

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

Parameters

[in]	**pData**	is the univariate time series data (a one dimensional array).
[in]	**nSize**	is the number of elements in pData.
[in]	**bAscending**	is the time order in the data series (i.e. the first data point's corresponding date (earliest date=1 (default), latest date=0)).
[in]	**alpha**	is the smoothing factor (alpha should be between zero and one (exclusive)). If missing or omitted, a value of 0.333 is used.
[in]	**xlHorizon**	is the forecast time horizon beyond the end of X. If missing, a default value of 0 (latest or end of X) is assumed.
[in]	**bOptimize**	is a flag (True/False) for searching and using the optimal value of the smoothing factor. If missing or omitted, optimize is assumed false.
[out]	**retVal**	is the calculated value of this function.

Remarks

1. The Brown's Linear exponential smoothing function F_{T+m} is defined as: $$S'_1 = X_1$$ $$S''_1 = X_1$$ $$S'_{t>1} = \alpha X_{t} + (1-\alpha)S'_{t-1}$$ $$S''_{t>1} = \alpha S'_{t} + (1-\alpha)S''_{t-1}$$ $$a_t = 2S'_t - S''_t$$ $$b_t = \frac{\alpha}{1-\alpha}\times (S'_t - S''_t)$$ $$F_{T+m} = a_T + m\times b_T$$ Where:
   - X_t is the value of the time series at time t.
   - T is the time of the latest observation in the sample data.
   - α is the smoothing factor.
2. m is the estimate time/horizon (past the end of raw data).
3. To search for the optimal value of the smoothing factor (alpha), the time series must have two(2) or more non-missing observations.
4. The time series is homogeneous or equally spaced.
5. The time series may include missing values (e.g. NaN) at either end.

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")]