NDK_SESMTH

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- C/C++
- .Net

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

Returns the (Brown's) simple exponential (EMA) 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] **nHorizon** is the forecast time horizon beyond the end of pData. If missing, a default value of 0 (latest or end of pData) 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 simple exponential smoothing function S_t is defined as follow: $$S_1=X_1 $$ $$S_{t \succ 1}= \alpha\times X_{t-1} + (1-\alpha)\times S_{t-1} $$ $$S_{t \succ T}=S_T$$ 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. The time series is homogeneous or equally spaced.
3. The time series may include missing values (e.g. NaN) at either end.
4. Exponential smoothing and moving average are similar in that they both assume a stationary, not trending, time series.
5. If a trend exists in the time series, the simple exponential lags behind the trend.
6. To search for the optimal values of the smoothing factor (alpha), the time series must have two(2) or more non-missing observations.
7. The exponential smoothing function differs from the weighted moving average (WMA) in that exponential smoothing takes into account all past data, whereas moving average only takes into account k past data points.

Requirements

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

Examples

```
int NDK_SESMTH(double[]  pData,
               int       nSize,
               BOOL      bAscending,
               ref double alpha,
               int       nHorizon,
               BOOL      bOptimize,
               ref double retVal
              )
```

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

Returns the (Brown's) simple exponential (EMA) 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] **nHorizon** is the forecast time horizon beyond the end of pdata. If missing, a default value of 0 (latest or end of pdata) 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 simple exponential smoothing function S_t is defined as follow: $$S_1=X_1 $$ $$S_{t \succ 1}= \alpha\times X_{t-1} + (1-\alpha)\times S_{t-1} $$ $$S_{t \succ T}=S_T$$ 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. The time series is homogeneous or equally spaced.
3. The time series may include missing values (e.g. NaN) at either end.
4. Exponential smoothing and moving average are similar in that they both assume a stationary, not trending, time series.
5. If a trend exists in the time series, the simple exponential lags behind the trend.
6. To search for the optimal values of the smoothing factor (alpha), the time series must have two(2) or more non-missing observations.
7. The exponential smoothing function differs from the weighted moving average (WMA) in that exponential smoothing takes into account all past data, whereas moving average only takes into account k past data points.

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")]