

NDK_INTEG

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- C/C++
- .Net

```
int __stdcall NDK_INTEG(double * X,  
                        size_t  N,  
                        size_t  S,  
                        size_t  D,  
                        double * X0,  
                        size_t  N0  
                        )
```

Returns an array of cells for the integrated time series (inverse operator of NDK_DIFF).

Returns

status code of the operation

Return values

NDK_SUCCESS Operation successful

NDK_FAILED Operation unsuccessful. See [Macros](#) for full list.

Parameters

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

[in] **N** is the number of observations in X.

[in] **S** is the lag order (e.g. k=0 (no lag), k=1 (1st lag), etc.).

[in] **D** is the number of repeated differencing (e.g. d=0 (none), d=1 (difference once), 2= (difference twice), etc.).

[in] **X0** is the initial (un-differenced) univariate time series data (a one dimensional array).
If missing (i.e. NULL), zeros are assumed.

[in] **N0** is the number of observations in X0.

Remarks

1. The input (differenced) time series (i.e. Y) is defined as follow: $[Y_t = \left(1 - L^k\right)^d X_t]$

Where:

- $\left(Y_t\right)$ is the differenced time series.
- $\left(X_t\right)$ is the input time series.
- (L) is the lag (backward shift or backshift) operator.
- (k) is the seasonal difference order.
- (d) is the number of repeated differencing.

2. The initial values array is assumed to end at the last non-missing value in the difference array start

3. If the difference cell range includes missing values at the beginning, the result array will substitute the initial values for missing ones; as we assume the initial values cover up to 1st non-missing value.
4. The time series is homogeneous or equally spaced.
5. The time series may include missing values (e.g. NaN) at either end.
6. The **integral transform** operator requires an SxD points in the initial time series (i.e. X0). If X0 is missing or has fewer points, points with zeros values are appended.
7. The time order (i.e. ascending or descending) for the initial (un-differenced) time series X0) is assumed the same as the differenced time series (Y).
8. Similar to the DIFF operator, INTG can be cascaded (i.e. INTG(INTG(INTG...))), but care must be taken when you specify the initial time series for each level.
9. The lag order (i.e. k) must be non-negative and smaller than the time series size. $[0 \leq K \leq T - 1]$

Requirements

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

Examples

```
int NDK_INTEG(double[] data,
             UIntPtr nSize,
             UIntPtr nLag,
             UIntPtr nDifference,
             double[] pX0,
             UIntPtr nX0Len
            )
```

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

Returns an array of cells for the integrated time series (inverse operator of NDK_DIFF).

Returns

status code of the operation

Return values

NDK_SUCCESS Operation successful

NDK_FAILED Operation unsuccessful. See [Macros](#) for full list.

Parameters

- [in,out] **data** is the univariate time series data (a one dimensional array).
- [in] **nSize** is the number of observations in data.
- [in] **nLag** is the lag order (e.g. k=0 (no lag), k=1 (1st lag), etc.).
- [in] **nDifference** is the number of repeated differencing (e.g. d=0 (none), d=1 (difference once), 2=(difference twice), etc.).
- [in] **pX0** is the initial (un-differenced) univariate time series data (a one dimensional array). If missing (i.e. NULL), zeros are assumed.
- [in] **nX0Len** is the number of observations in pX0.

Remarks

- The input (differenced) time series (i.e. Y) is defined as follow: $Y_t = (1-L)^k (1-L^s)^d X_t$
Where:
 - Y_t is the differenced time series.
 - X_t is the input time series.
 - L is the lag (backward shift or backshift) operator.
 - k is the seasonal difference order.
 - d is the number of repeated differencing.
- The initial values array is assumed to end at the last non-missing value in the difference array start
- If the difference cell range includes missing values at the beginning, the result array will substitute the initial values for missing ones; as we assume the initial values cover up to 1st non-missing value.
- The time series is homogeneous or equally spaced.
- The time series may include missing values (e.g. NaN) at either end.
- The **integral transform** operator requires an SxD points in the initial time series (i.e. pX0). If pX0 is missing or has fewer points, points with zeros values are appended.
- The time order (i.e. ascending or descending) for the initial (un-differenced) time series pX0) is assumed the same as the differenced time series (Y).
- Similar to the DIFF operator, INTG can be cascaded (i.e. INTG(INTG(INTG...))), but care must be taken when you specify the initial time series for each level.
- The lag order (i.e. k) must be non-negative and smaller than the time series size. $0 \leq k \leq T-1$

Requirements

Header	SFSDK.H

Library	SFSDK.LIB
DLL	SFSDK.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")]
