NDK_MEANTEST

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- C/C++
- .Net

```
int __stdcall NDK_MEANTEST(double * X,
                           size_t   N,
                           double   target,
                           double   alpha,
                           WORD     method,
                           WORD     retType,
                           double * retVal
                          )
```

Calculates the p-value of the statistical test for the population mean.

Returns

status code of the operation

Return values

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

Parameters

[in] **X** is the sample data (a one dimensional array).
[in] **N** is the number of observations in X.
[in] **target** is the assumed mean value. If missing, a default of zero is assumed.
[in] **alpha** is the statistical significance level. If missing, the default of 5% is assumed.
[in] **method** is the statistical test to perform (1=parametric).
[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.

[out] **retVal** is the calculated test statistics.

Remarks

1. The sample data may include missing values (NaN).
2. The test hypothesis for the population mean: \[H_{o}: \mu=\mu_o\] \[H_{1}: \mu\neq \mu_o\]
   Where:
   - \(H_{o}\) is the null hypothesis.
   - \(H_{1}\) is the alternate hypothesis.
   - \(\mu_o\) is the assumed population mean.

- μ is the actual population mean.

3. For the case in which the underlying population distribution is normal, the sample mean/average has a Student's t with T-1 degrees of freedom sampling distribution: $$\bar x \sim t_{\nu=T-1}(\mu,\frac{S^2}{T})$$ Where:
   - $\bar x$ is the sample average.
   - μ is the population mean/average.
   - S is the sample standard deviation. $$S^2 = \frac{\sum_{i=1}^T(x_i-\bar x)^2}{T-1}$$
   - T is the number of non-missing values in the data sample.
   - $t_{\nu}()$ is the Student's t-Distribution.
   - ν is the degrees of freedom of the Student's t-Distribution.
4. The Student's t-Test for the population mean can be used for small and for large data samples.
5. This is a two-sides (i.e. two-tails) test, so the computed p-value should be compared with half of the significance level ($\frac{\alpha}{2}$).
6. The underlying population distribution is assumed normal (Gaussian).

Requirements

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

Examples

```
int NDK_MEANTEST(double[]   pData,
                 UIntPtr    nSize,
                 double     target,
                 double     alpha,
                 UInt16     argMethod,
                 UInt16     retType,
                 out double retVal
                )
```

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

Calculates the p-value of the statistical test for the population mean.

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 sample data (a one dimensional array).

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

[in] **target** is the assumed mean value. If missing, a default of zero is assumed.

[in] **alpha** is the statistical significance level. If missing, the default of 5% is assumed.

[in] **argMethod** is the statistical test to perform (1=parametric).

[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.

[out] **retVal** is the calculated test statistics.

Remarks

1. The sample data may include missing values (NaN).
2. The test hypothesis for the population mean: \[H_{o}: \mu=\mu_o\] \[H_{1}: \mu\neq \mu_o\] Where:
   - \(H_{o}\) is the null hypothesis.
   - \(H_{1}\) is the alternate hypothesis.
   - \(\mu_o\) is the assumed population mean.
   - \(\mu\) is the actual population mean.
3. For the case in which the underlying population distribution is normal, the sample mean/average has a Student's t with T-1 degrees of freedom sampling distribution: \[\bar x \sim t_{\nu=T-1}(\mu,\frac{S^2}{T}) \] Where:
   - \(\bar x\) is the sample average.
   - \(\mu\) is the population mean/average.
   - \(S\) is the sample standard deviation. \[S^2 = \frac{\sum_{i=1}^T(x_i-\bar x)^2}{T-1}\]
   - \(T\) is the number of non-missing values in the data sample.
   - \(t_{\nu}()\) is the Student's t-Distribution.
   - \(\nu\) is the degrees of freedom of the Student's t-Distribution.
4. The Student's t-Test for the population mean can be used for small and for large data samples.
5. This is a two-sides (i.e. two-tails) test, so the computed p-value should be compared with half of the significance level (\(\frac{\alpha}{2}\)).
6. The underlying population distribution is assumed normal (Gaussian).

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")]