Data Analysis T-SQL User Functions

DATSUF

User Manual

Version 1.0

July 2009

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1. What is Data Analysis T-SQL User Functions

Thanks you for downloading Data Analysis T-SQL User Functions library (DATSUF).

DATSUF is a development kit which enables you to create quickly and easily complicated data analysis T-SQL queries.

DATSUF is a set of assembly T-SQL User Functions that can be incorporate into T-SQL statements or in any T-SQL query generated by .NET language.

Once you install DATSUF in your MS SQL server database you will be able to run queries such as the following query:

<div align="center">

Select **LinearRegXY**(Parameters) from TableName

</div>

This query (as an example) calculates the linear regression of Y over X from a given table.

DATSUF include many other functions and it is growing on monthly basis. Once you purchase a commercial license you will be able to download updates of future versions.

DATSUF is safe!

Since it is build on top of Microsoft security features of SQL Server user functions, DATSUF is safe! DATSUF functions can only read data from your server, but it is unable to write anything!

2. License terms

DATSUF demo version can be downloaded for free from the DATSUF web site. You may use the demo version for unlimited amount of time. The only limitation of the demo version is the fact that the demo version works only with data table named "Data1". If you tried to run the demo version with a different table name you will get a run time exception.

DATSUF is distributes on a per server license. You need to register each copy of DATSUF for a specific MS SQL server.

The procedure of purchasing a commercial license is as follows:

Once you are satisfied with the demo version (see next section for downloading a demo version) run the following query using the MS query analyzer:

<p align="center"><code>select @@SERVERNAME</code></p>

For that query, the MS SQL server response with the computer name where it is.
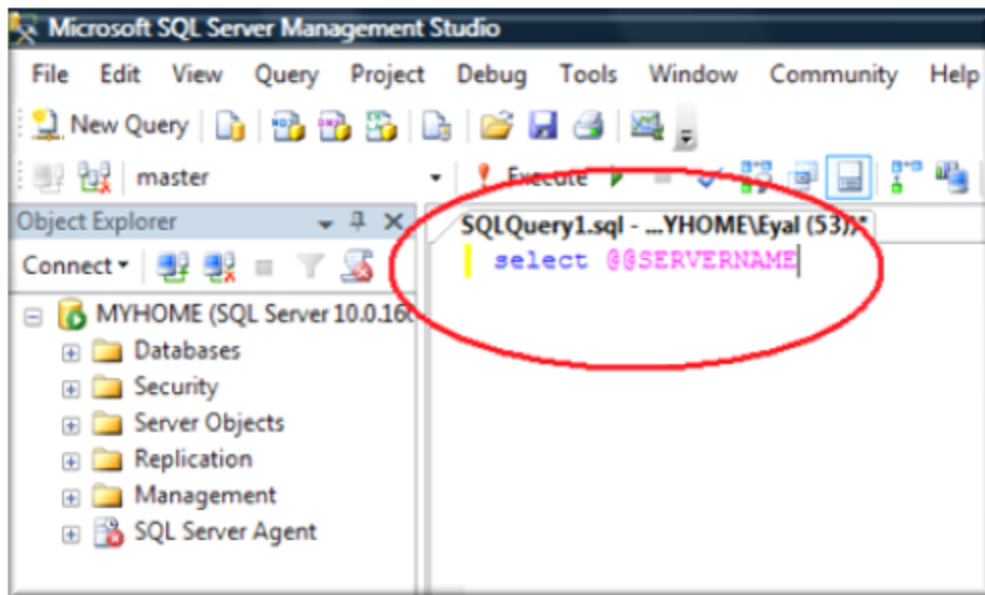
Screen 1: Getting computer name for registration

Once you are sure about your computer name log into the DATSUF web site and go to the **Buy License** web page. Complete the payment procedure. **Do not forget to add you computer name and your email address**.

If you got an approval for your payment, a registered copy of DATSUF library will be sent to your email within 24 hours (after validation of payment).

3. Install, Uninstall and Demo

Installation of the DATSUF library is performed using the following procedure:

Step 1: Go to the Assemblies section of the database where you would like to install DATSUF.
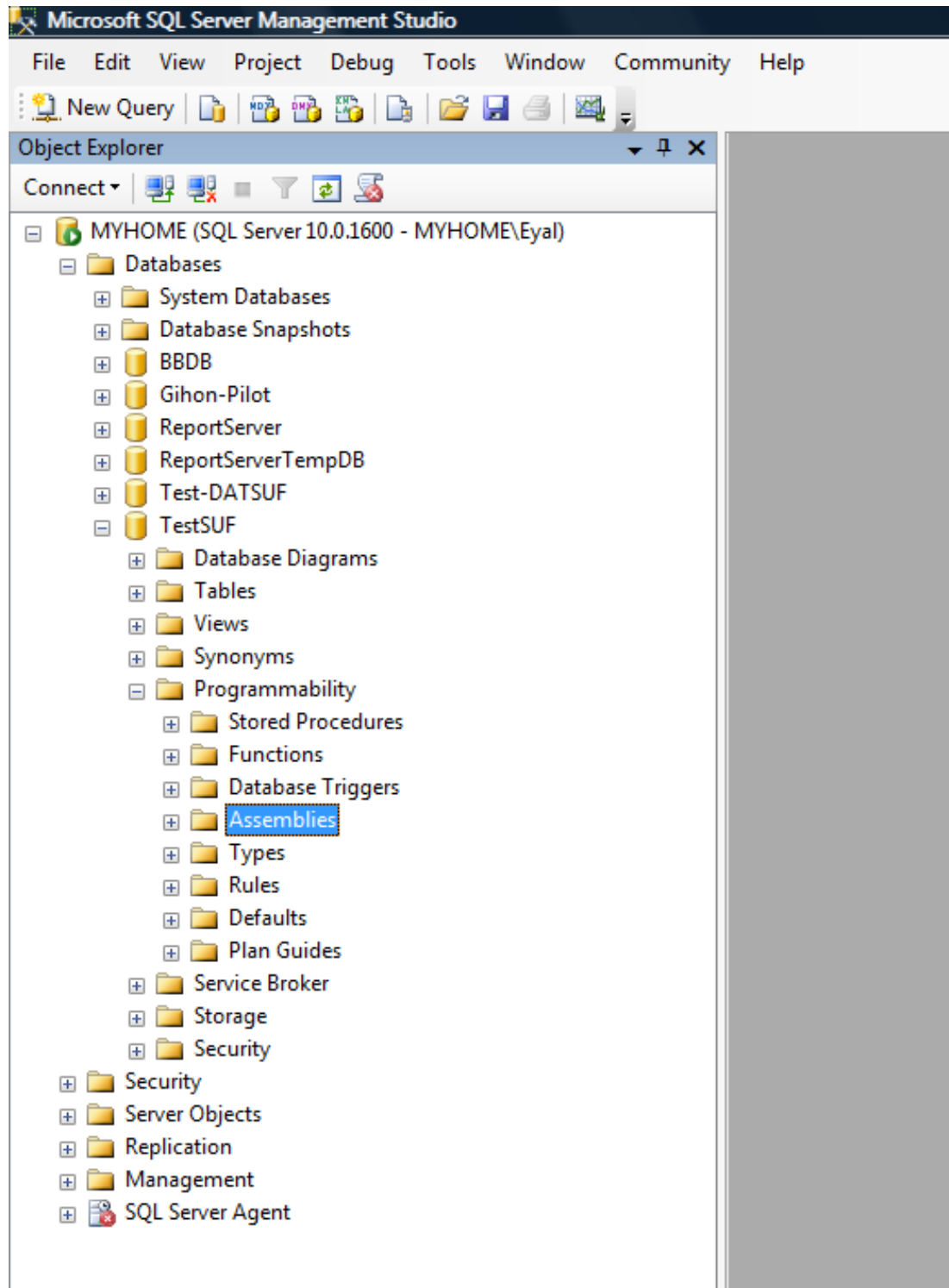
Step 2: Right click the selected leaf and select "NEW Assembly".

A screen as show in the picture below will be popped up.
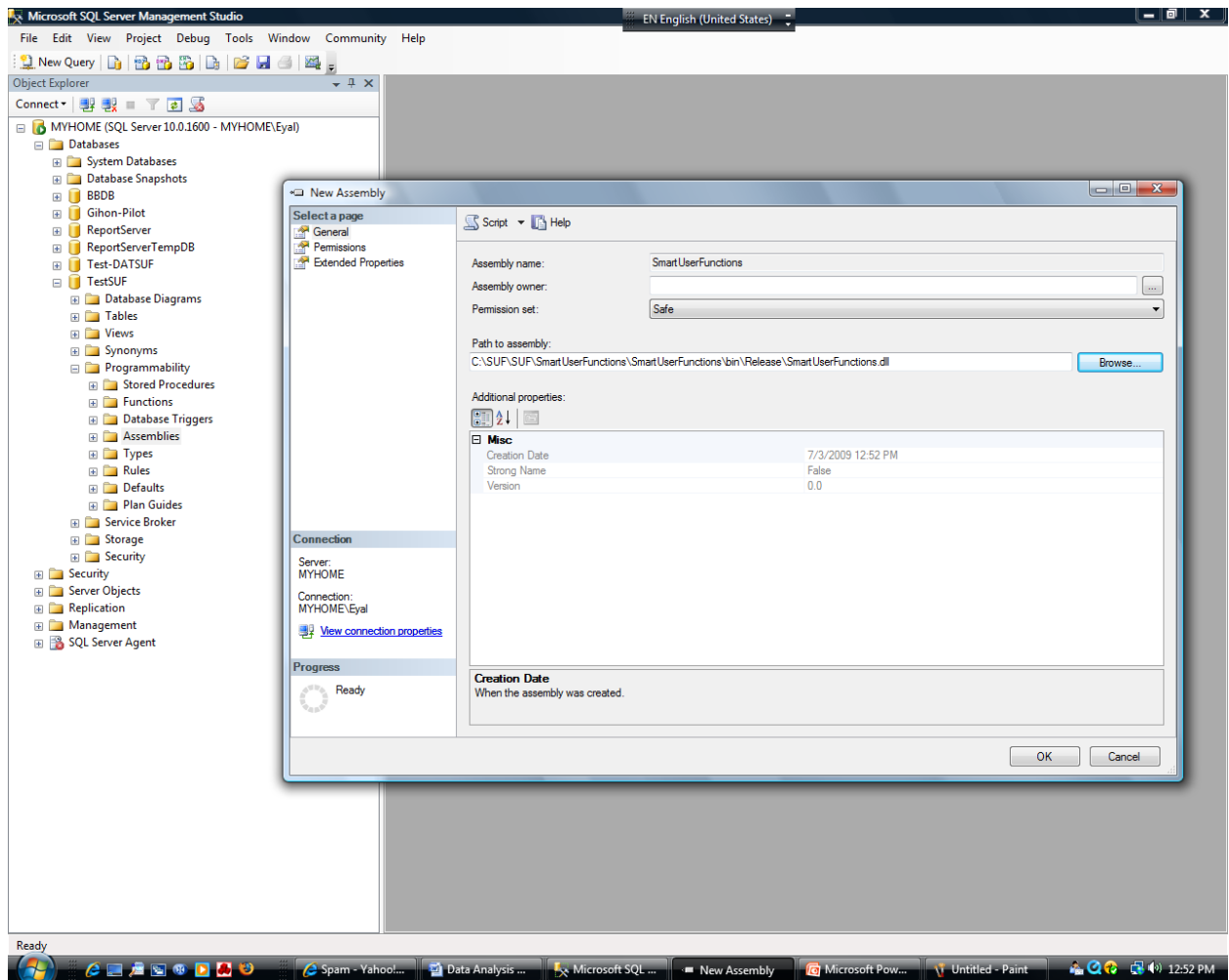
Browse to the location where you copied the DATSUF.dll file.

Click the OK button. The Assemblies section of the database should contain now a leaf with the name of the DATSUF.

Step 3: Load into the Query analyzed the DATSUF-Basic.sql script that you downloaded from the DATSUF download web page.

Run the script using the Execute button.

The DATSUF library is now ready for use!

You must perform this procedure for every database you would like to use the DATSUF library.

Uninstall DATSUF

In order to uninstall DATSUF load and run the Uninstall script.

Demo Database

In order to evaluate DATSUF you may download the **DemoDATSUF** database from the **DATSUF** web site. Download also the SQLTestAll.sql script. This script contains ready maid script to test each of the functions.

4. Basic module functions list

4.1 AvgLagN – Average of a field based on Lagged N field values

Description

Calculates the average of a field in a query result set based on the last N records.

Average will include first and last record in the lagged selected records.

In case no records were found (or in case of exception) function returns null.

Example

```
select Id, X1, AvgLagN('Data1','x1',4,2,'Id',Id) as AVGX1 from Data1
```

Result

Average field X1 from the result set for each record based on records located between the 4th and the 2nd location relative to the location of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
fromN	int	The starting record to average relative to the position of the current record in the result set.
toN	int	The ending record to average relative to the position of the current record in the result set.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.2 AvgLastMin – Average of a field based on Last N minutes records

Description

Calculates the average of a field in a query result set based on records from the last N minutes.
Average will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example

```
select dDateTime, X1,
dbo.AvgLastMin('Data1','x1',90,'dDateTime',dDateTime) from dbo.Data1
```

Result

Average field X1 from the result set for each record based on records located in the last N minutes relative to the time stamp of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
N	Long	The size of time window to average in terms of minutes.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.3 AvgLastN – Average of a field based on Last N records

Description
Calculates the average of a field in a query result set based on records from the last N records.

Average will include first and last record in the selected records.

In case no records were found (or in case of exception) function returns null.

Example
```
select dbo.Data1.dDateTime, dbo.Data1.X1,
dbo.AvgLastN('Data1','x1',3,'Id',Id) from dbo.Data1
```

Result
Average field X1 from the result set for each record based on records located in the last N records relative to the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
N	int	The size of time window to average in terms of number of records.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.4 AvgTimeWindow – Average of a field based on records located in a relative time window

Description

Calculates the average of a field in result set, based on records located in a relative time window.
Average will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example

```
select dDateTime, X1,
dbo.AvgTimeWindow('Data1','x1',90,60,'dDateTime',dDateTime) from dbo.Data1
```

Result

Average field X1 from the result set for each record based on records located in a time window which start 90 minutes before current record and ends 60 minutes before current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
fromMinutesAgo	long	The start point of the time window relative to current record.
toMinutesAgo	long	The end point of the time window relative to current record.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.5 CorrLagN – Correlation between two fields based on Lagged N fields values

Description

Calculates the correlation between two fields based on lagged N records.

Calculation will include first and last record in the lagged selected records.

In case no records were found (or in case of exception) function returns null.

Example

```
select Id, X1, X2, dbo.CorrLagN('Data1','X1','X2', 10,2,'Id',Id) as CORR1
from Data1
```

Result

Correlate field X1 and field X2 from the result set for each record based on records located between the 10th and the 2nd location relative to the location of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varNameX	String	Field name of the first variable
varNameY	String	Field name of the second variable
fromN	int	The starting record to average relative to the position of the current record in the result set.
toN	int	The ending record to average relative to the position of the current record in the result set.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.6 CorrLastMin – Correlation between two fields based on Last records from N minutes.

Description

Calculates the correlation between two fields based on records from the last N minutes.
Calculation will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example

```
select dDateTime, X1, X2, dbo.CorrLastMin('Data1','X1','X2',
600,'dDateTime',dDateTime) as CORR1 from Data1
```

Result

Correlate field X1 and field X2 from the result set for each record based on records located between current record and record in the last 600 minutes.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varNameX	String	Field name of the first variable
varNameY	String	Field name of the second variable
N	long	The size of time window to average in terms of minutes.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.7 CorrLastN – Correlation between two fields based on Last N records.

Description
Calculates the correlation between two fields based on last N records.
Calculation will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example
```
select dbo.Data1.dDateTime, X1, X2, dbo.CorrLastN('Data1','X1','X2',
4,'Id',Id) as CORR1 from Data1
```

Result
Correlate field X1 and field X2 from the result set for each record based on last 4 records.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varNameX	String	Field name of the first variable
varNameY	String	Field name of the second variable
N	long	The size of time window to average in terms of minutes.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.8 CorrTimeWindow – Correlation between two fields based on time window

Description
Calculates the correlation between two fields based on records located in a relative time window.
Calculation will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example
```
select dDateTime, X1, X2, dbo.CorrTimeWindow('Data1','X1','X2',
200,10,'dDateTime',dDateTime) as CORR1 from Data1
```

Result
Correlate field X1 and field X2 from the result set based on records located in a time window which start 200 minutes before current record and ends 10 minutes before current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varNameX	String	Field name of the first variable
varNameY	String	Field name of the second variable
fromMinutesAgo	long	The start point of the time window relative to current record.
toMinutesAgo	long	The end point of the time window relative to current record.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.9 CountLastMin – Count the number of records in the last N minutes

Description
Calculates the number of records located in the last N minutes.
Calculation will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example
```
select Id,dDateTime, dbo.CountLastMin('Data1',300,'dDateTime',dDateTime)
as count1 from Data1
```

Result
Count the number of records in the last 300 minutes prior the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
N	long	The size of time window to average in terms of last minutes.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The datetime value of the current record.

4.10 CountTimeWindow – Count the number of records for a moving time window

Description

Calculates the number of records located in a relative moving time window.

Calculation will include first and last record in the selected records.

In case no records were found (or in case of exception) function returns null.

Example

```
select Id,dDateTime,
dbo.CountTimeWindow('Data1',180,30,'dDateTime',dDateTime) as count1 from
Data1
```

Result

Count the number of records in a relative moving time window stating 180 minutes prior to each records and ends in 30 minutes prior to each record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
fromMinutesAgo	long	The start point of the time window relative to current record.
toMinutesAgo	long	The end point of the time window relative to current record.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The datetime value of the current record.

4.13 CovLagN – Covariance between two fields based on Lagged N fields values

Description
Calculates the covariance between two fields based on lagged N records.
Calculation will include first and last record in the lagged selected records.
In case no records were found (or in case of exception) function returns null.

Example
```
select Id, X1, X2, dbo.CovLagN('Data1','X1','X2', 10,2,'Id',Id) as CORR1
from Data1
```

Result
Covariance field X1 and field X2 from the result set for each record based on records located between the 10th and the 2nd location relative to the location of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varNameX	String	Field name of the first variable
varNameY	String	Field name of the second variable
fromN	int	The starting record to average relative to the position of the current record in the result set.
toN	int	The ending record to average relative to the position of the current record in the result set.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.12 CovLastMin – Covariance between two fields based on Last records from N minutes.

Description

Calculates the covariance between two fields based on records from the last N minutes.
Calculation will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example

```
select dDateTime, X1, X2, dbo.CovLastMin('Data1','X1','X2',
600,'dDateTime',dDateTime) as CORR1 from Data1
```

Result

Covariance field X1 and field X2 from the result set for each record based on records located between current record and record in the last 600 minutes.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varNameX	String	Field name of the first variable
varNameY	String	Field name of the second variable
N	long	The size of time window to average in terms of minutes.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.13 CovLastN – Covariance between two fields based on Last N records.

Description
Calculates the covariance between two fields based on last N records.
Calculation will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example
```
select dbo.Data1.dDateTime, X1, X2, dbo.CovLastN('Data1','X1','X2',
4,'Id',Id) as CORR1 from Data1
```

Result
Covariance field X1 and field X2 from the result set for each record based on last 4 records.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varNameX	String	Field name of the first variable
varNameY	String	Field name of the second variable
N	long	The size of time window to average in terms of minutes.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.14 CovTimeWindow – Covariance between two fields based on time window

Description

Calculates the covariance between two fields based on records located in a relative time window.
Calculation will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example

```
select dDateTime, X1, X2, dbo.CovTimeWindow('Data1','X1','X2',
200,10,'dDateTime',dDateTime) as CORR1 from Data1
```

Result

Covariance field X1 and field X2 from the result set based on records located in a time window which start 200 minutes before current record and ends 10 minutes before current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varNameX	String	Field name of the first variable
varNameY	String	Field name of the second variable
fromMinutesAgo	long	The start point of the time window relative to current record.
toMinutesAgo	long	The end point of the time window relative to current record.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.15 GetVersion – Returns the version number of the DAUF

Description
Return the version number of the Data Analysis user Function library.

Example

```sql
select dbo.GetVersion()
```

Result
For current version this function returns a string "1.0.0.0 Demo version". If the library is registered to a user machine (commercial license) the answer will be "1.0.0.0 User Machine Name, User SQL server Name"

Inputs details

Input name	Input type	Description

4.16 LagVar – Get a lagged field value

Description
Gets a value of a field in a result set located in a record located at the Nth position relative to current record. If no such record exists, function returns NULL.

Example
```
select Id, X1,dbo.LagVar('Data1','X1',3,'Id',Id) as LagX1 from Data1
```

Result
Get the value of X1 field from a record located 3 records prior to current record..

Inputs details

Input name	Input type	Description
tableName	String	Table name
varNameX	String	Field name of the field
N	long	The size of time window to average in terms of minutes.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.17 LinearRegXY – Linear Reg of Y over X

Description

Calculates the linear regression result of Y over X for a given table.

Example

```
select Id, X1,X2, dbo.LinearRegXY('Data1','X1','X2',X1) as LinearRegXY
from data1
```

Result

Get the value of linear regression for X1 field from table based on Data1 table.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varNameX	String	Field name of the un depended field
varNameY	String	Field name of the depended field
xVal	Double	Value for calculation. My be a numeric value or the name of a field.

4.18 LinearRegXYLagN – Linear Reg of Y over X based on lagged records

Description
Calculates the linear regression result of Y over X based on lagged records relative to current record.

Example
```
select Id, X1,X2, dbo.LinearRegXYLagN('Data1','X1','X2',10,3,'Id',Id,14.6)
as LinearReg from Data1
```

Result
Get the value of linear regression for each record in a table for X1 field based records located 10 to 3 positions prior to current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varNameX	String	Field name of the un depended field
varNameY	String	Field name of the depended field
fromN	int	The starting record to average relative to the position of the current record in the result set.
toN	int	The ending record to average relative to the position of the current record in the result set.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.
xVal	Double	Value for calculation. My be a numeric value or the name of a field.

4.19 LinearRegXYLastMin – Linear Reg of Y over X based last N minutes

Description

Calculates the linear regression result of Y over X based on records located in a relative window of last N minutes.

Example

```
select dDateTime,
X1,dbo.LinearRegXYLastMin('Data1','x1','x2',900,'dDateTime',dDateTime,x1)
from dbo.Data1
```

Result

Get the value of linear regression for each record in a table for X1 field based records located in the last 900 minutes relatively to current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varNameX	String	Field name of the un depended field
varNameY	String	Field name of the depended field
N	int	The size of data windows in terms of last N minutes.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.
xVal	Double	Value for calculation. My be a numeric value or the name of a field.

4.20 LinearRegXYLastN – Linear Reg of Y over X based last N records

Description
Calculates the linear regression result of Y over X based on last N records.

Example
```
select dbo.Data1.dDateTime, dbo.Data1.X1,
dbo.LinearRegXYLastN('Data1','x1','x2',6,'Id',Id,x1) from dbo.Data1
```

Result
Get the value of linear regression for each record in a table for X1 field based on last N records.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varNameX	String	Field name of the un depended field
varNameY	String	Field name of the depended field
N	int	The size of data windows in terms of N last records.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.
xVal	Double	Value for calculation. My be a numeric value or the name of a field.

4.21 LinearRegXYTimeWindow – Linear Reg of Y over X using time window

Description
Calculates the linear regression result of Y over X based on relative time window.

Example
```
select dbo.Data1.dDateTime, dbo.Data1.X1,
dbo.LinearRegXYTimeWindow('Data1','x1','x2',600,60,'dDateTime',dDateTime,x
1) from dbo.Data1
```

Result
Get the value of linear regression for each record in a table for X1 field based on time window.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varNameX	String	Field name of the un depended field
varNameY	String	Field name of the depended field
fromMinutesAgo	long	The start point of the time window relative to current record.
toMinutesAgo	long	The end point of the time window relative to current record.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.
xVal	Double	Value for calculation. My be a numeric value or the name of a field.

4.22 MaxLagN – Max of a field based on Lagged N field values

Description

Calculates the maximum of a field in a query result set based on the last N records.
Max will include first and last record in the lagged selected records.
In case no records were found (or in case of exception) function returns null.

Example

```
select Id, X1, MaxLagN('Data1','x1',4,2,'Id',Id) as AVGX1 from Data1
```

Result

Max field X1 from the result set for each record based on records located between the 4th and the 2nd location relative to the location of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
fromN	int	The starting record to average relative to the position of the current record in the result set.
toN	int	The ending record to max relative to the position of the current record in the result set.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.23   MaxLastMin – Maximum of a field based on Last N minutes records

Description

Calculates the max of a field in a query result set based on records from the last N minutes.
Maximum will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example

```
select dDateTime, X1,
dbo.MaxLastMin('Data1','x1',90,'dDateTime',dDateTime) from dbo.Data1
```

Result

Maximum field X1 from the result set for each record based on records located in the last N minutes
relative to the time stamp of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
N	Long	The size of time window to max in terms of minutes.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.24   MaxLastN – Maximum of a field based on Last N records

Description

Calculates the maximum of a field in a query result set based on records from the last N records.

Maximum will include first and last record in the selected records.

In case no records were found (or in case of exception) function returns null.

Example

```
select dbo.Data1.dDateTime, dbo.Data1.X1,
dbo.MaxLastN('Data1','x1',3,'Id',Id) from dbo.Data1
```

Result

Maximum field X1 from the result set for each record based on records located in the last N records relative to the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
N	int	The size of time window to max in terms of number of records.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.25 MaxTimeWindow – Maximum of a field based on records located in a relative time window

Description

Calculates the maximum of a field in result set, based on records located in a relative time window.
Maximum will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example

```
select dDateTime, X1,
dbo.MaxTimeWindow('Data1','x1',90,60,'dDateTime',dDateTime) from dbo.Data1
```

Result

Maximum field X1 from the result set for each record based on records located in a time window which start 90 minutes before current record and ends 60 minutes before current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
fromMinutesAgo	long	The start point of the time window relative to current record.
toMinutesAgo	long	The end point of the time window relative to current record.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.26 MinLagN – Min of a field based on Lagged N field values

Description
Calculates the minimum of a field in a query result set based on the last N records.
Min will include first and last record in the lagged selected records.
In case no records were found (or in case of exception) function returns null.

Example
```
select Id, X1, MinLagN('Data1','x1',4,2,'Id',Id) as min1 from Data1
```

Result
Min field X1 from the result set for each record based on records located between the 4th and the 2nd location relative to the location of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
fromN	int	The starting record to min relative to the position of the current record in the result set.
toN	int	The ending record to max relative to the position of the current record in the result set.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.27 MinLastMin – minimum of a field based on Last N minutes records

Description

Calculates the min of a field in a query result set based on records from the last N minutes.

Minimum will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example

```
select dDateTime, X1,
dbo.MinLastMin('Data1','x1',90,'dDateTime',dDateTime) from dbo.Data1
```

Result

Minimum field X1 from the result set for each record based on records located in the last N minutes relative to the time stamp of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
N	Long	The size of time window to min in terms of minutes.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.28 MinLastN – Minimum of a field based on Last N records

Description

Calculates the minimum of a field in a query result set based on records from the last N records.

Minimum will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example

```
select dbo.Data1.dDateTime, dbo.Data1.X1,
dbo.MinLastN('Data1','x1',3,'Id',Id) from dbo.Data1
```

Result

minimum field X1 from the result set for each record based on records located in the last N records relative to the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
N	int	The size of time window to min in terms of number of records.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.29 MinTimeWindow – Minimum of a field based on records located in a relative time window

Description
Calculates the minimum of a field in result set, based on records located in a relative time window.
Minimum will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example
```
select dDateTime, X1,
dbo.MinTimeWindow('Data1','x1',90,60,'dDateTime',dDateTime) from dbo.Data1
```

Result
Minimum field X1 from the result set for each record based on records located in a time window which start 90 minutes before current record and ends 60 minutes before current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
fromMinutesAgo	long	The start point of the time window relative to current record.
toMinutesAgo	long	The end point of the time window relative to current record.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.30   SlopVarLagN – Slop var of a field based on Lagged N field values

Description

Calculates the slop of a field in a query result set based on the last N records.

Slop will include first and last record in the lagged selected records.
In case no records were found (or in case of exception) function returns null.

Example

```
select Id, X1, SlopVarLagN('Data1','x1',4,2,'Id',Id) as Slop1 from Data1
```

Result

Slop field X1 from the result set for each record based on records located between the 4th and the 2nd location relative to the location of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
fromN	int	The starting record to slop relative to the position of the current record in the result set.
toN	int	The ending record to slop relative to the position of the current record in the result set.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.31 SlopVarLastMin – Slop var of a field based on Last N minutes records

Description
Calculates the slop of a field in a query result set based on records from the last N minutes.
Slop will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example
```
select dDateTime, X1,
dbo.SlopLastMin('Data1','x1',90,'dDateTime',dDateTime) from dbo.Data1
```

Result
Slop field X1 from the result set for each record based on records located in the last N minutes relative to the time stamp of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
N	Long	The size of time window to slop in terms of minutes.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.32 SlopVarLastN – Slop var of a field based on Last N records

Description

Calculates the slop of a field in a query result set based on records from the last N records.

Slop will include first and last record in the selected records.

In case no records were found (or in case of exception) function returns null.

Example

```
select dbo.Data1.dDateTime, dbo.Data1.X1,
dbo.SlopVarLastN('Data1','x1',3,'Id',Id) from dbo.Data1
```

Result

Slop field X1 from the result set for each record based on records located in the last N records relative to the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
N	int	The size of time window to Slop in terms of number of records.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.33 SlopVarTimeWindow – Slop var of a field based on records located in a relative time window

Description

Calculates the slop of a field in result set, based on records located in a relative time window.
Slop will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example

```
select dDateTime, X1,
dbo.SlopVarTimeWindow('Data1','x1',90,60,'dDateTime',dDateTime) from
dbo.Data1
```

Result

Slop field X1 from the result set for each record based on records located in a time window which start 90 minutes before current record and ends 60 minutes before current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
fromMinutesAgo	long	The start point of the time window relative to current record.
toMinutesAgo	long	The end point of the time window relative to current record.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.34   StdevLagN – Std var of a field based on Lagged N field values

Description

Calculates the Standard deviation (stdev) of a field in a query result set based on the last N records.
Stdev will include first and last record in the lagged selected records.
In case no records were found (or in case of exception) function returns null.

Example

```
select Id, X1, StdevLagN('Data1','x1',4,2,'Id',Id) as Std1 from Data1
```

Result

Stdev field X1 from the result set for each record based on records located between the 4th and the 2nd location relative to the location of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
fromN	int	The starting record to stdev relative to the position of the current record in the result set.
toN	int	The ending record to stdev relative to the position of the current record in the result set.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.35   StdevLastMin – Std var of a field based on Last N minutes records

Description

Calculates the Standard deviation (stdev) of a field in a query result set based on records from the last N minutes. Stdev will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example

```
select dDateTime, X1,
dbo.StdevLastMin('Data1','x1',90,'dDateTime',dDateTime) from dbo.Data1
```

Result

Std field X1 from the result set for each record based on records located in the last N minutes relative to the time stamp of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
N	Long	The size of time window to stdev in terms of minutes.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.36   StdevLastN – Std var of a field based on Last N records

Description

Calculates the Standard deviation (stdev) of a field in a query result set based on records from the last N records.

Stdev will include first and last record in the selected records.

In case no records were found (or in case of exception) function returns null.

Example

```
select dbo.Data1.dDateTime, dbo.Data1.X1,
dbo.StdevLastN('Data1','x1',3,'Id',Id) from dbo.Data1
```

Result

Std field X1 from the result set for each record based on records located in the last N records relative to the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
N	int	The size of time window to stdev in terms of number of records.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.37 StdevTimeWindow – Std var of a field based on records located in a relative time window

Description
Calculates the Standard deviation (stdev) of a field in result set, based on records located in a relative time window. Stdev will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example
```
select dDateTime, X1,
dbo.StdevTimeWindow('Data1','x1',90,60,'dDateTime',dDateTime) from
dbo.Data1
```

Result
Stdev field X1 from the result set for each record based on records located in a time window which start 90 minutes before current record and ends 60 minutes before current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
fromMinutesAgo	long	The start point of the time window relative to current record.
toMinutesAgo	long	The end point of the time window relative to current record.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.38 StdevPLagN – Population Std var of a field based on Lagged N field values

Description

Calculates the population Standard deviation (StdevP) of a field in a query result set based on the last N records.

StdevP will include first and last record in the lagged selected records.

In case no records were found (or in case of exception) function returns null.

Example

```
select Id, X1, StdevPLagN('Data1','x1',4,2,'Id',Id) as Std1 from Data1
```

Result

StdevP field X1 from the result set for each record based on records located between the 4th and the 2nd location relative to the location of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
fromN	int	The starting record to StdevP relative to the position of the current record in the result set.
toN	int	The ending record to StdevP relative to the position of the current record in the result set.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.39   StdevPLastMin – Std var of a field based on Last N minutes records

Description
Calculates the population Standard deviation (Stdev) of a field in a query result set based on records from the last N minutes. StdevP will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example
```
select dDateTime, X1,
dbo.StdevPLastMin('Data1','x1',90,'dDateTime',dDateTime) from dbo.Data1
```

Result
StdevP field X1 from the result set for each record based on records located in the last N minutes relative to the time stamp of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
N	Long	The size of time window to StdevP in terms of minutes.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.40   StdevPLastN – Std var of a field based on Last N records

Description
Calculates the population Standard deviation (StdevP) of a field in a query result set based on records from the last N records.
StdevP will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example
```
select dbo.Data1.dDateTime, dbo.Data1.X1,
dbo.StdevPLastN('Data1','x1',3,'Id',Id) from dbo.Data1
```

Result
StdevP field X1 from the result set for each record based on records located in the last N records relative to the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
N	int	The size of time window to StdevP in terms of number of records.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.41 StdevTimeWindow – Std var of a field based on records located in a relative time window

Description

Calculates the Standard deviation (std) of a field in result set, based on records located in a relative time window. Std will include first and last record in the selected records.

In case no records were found (or in case of exception) function returns null.

Example

```
select dDateTime, X1,
dbo.StdevTimeWindow('Data1','x1',90,60,'dDateTime',dDateTime) from
dbo.Data1
```

Result

Std field X1 from the result set for each record based on records located in a time window which start 90 minutes before current record and ends 60 minutes before current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
fromMinutesAgo	long	The start point of the time window relative to current record.
toMinutesAgo	long	The end point of the time window relative to current record.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.42 SumLagN – Sum of a field based on Lagged N field values

Description

Calculates the sum of a field in a query result set based on the last N records.

Sum will include first and last record in the lagged selected records.
In case no records were found (or in case of exception) function returns null.

Example

```
select Id, X1, SumLagN('Data1','x1',4,2,'Id',Id) as Sum1 from Data1
```

Result

Sum field X1 from the result set for each record based on records located between the 4th and the 2nd location relative to the location of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
fromN	int	The starting record to Sum relative to the position of the current record in the result set.
toN	int	The ending record to Sum relative to the position of the current record in the result set.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.43   SumLastMin – Sum of a field based on Last N minutes records

Description
Calculates the Sum of a field in a query result set based on records from the last N minutes.
Sum will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example
```
select dDateTime, X1,
dbo.SumLastMin('Data1','x1',90,'dDateTime',dDateTime) from dbo.Data1
```

Result
Sum field X1 from the result set for each record based on records located in the last N minutes relative to the time stamp of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
N	Long	The size of time window to Sum in terms of minutes.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.44 SumLastN – Sum of a field based on Last N records

Description
Calculates the Sum of a field in a query result set based on records from the last N records.

Sum will include first and last record in the selected records.

In case no records were found (or in case of exception) function returns null.

Example
```
select dbo.Data1.dDateTime, dbo.Data1.X1,
dbo.SumLastN('Data1','x1',3,'Id',Id) from dbo.Data1
```

Result
Stum field X1 from the result set for each record based on records located in the last N records relative to the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
N	int	The size of time window to Sum in terms of number of records.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.45 SumTimeWindow – Sum of a field based on records located in a relative time window

Description
Calculates the Sum of a field in result set, based on records located in a relative time window.
Sum will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example
```
select dDateTime, X1,
dbo.SumTimeWindow('Data1','x1',90,60,'dDateTime',dDateTime) from dbo.Data1
```

Result
Sum field X1 from the result set for each record based on records located in a time window which start 90 minutes before current record and ends 60 minutes before current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
fromMinutesAgo	long	The start point of the time window relative to current record.
toMinutesAgo	long	The end point of the time window relative to current record.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.46 VarLagN – Var of a field based on Lagged N field values

Description

Calculates the Var of a field in a query result set based on the last N records.

Var will include first and last record in the lagged selected records.

In case no records were found (or in case of exception) function returns null.

Example

```
select Id, X1, VarLagN('Data1','x1',4,2,'Id',Id) as Var1 from Data1
```

Result

Var field X1 from the result set for each record based on records located between the 4th and the 2nd location relative to the location of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
fromN	int	The starting record to Var relative to the position of the current record in the result set.
toN	int	The ending record to Var relative to the position of the current record in the result set.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.47   VarLastMin – Var of a field based on Last N minutes records

Description
Calculates the Var of a field in a query result set based on records from the last N minutes.
Var will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example
```
select dDateTime, X1,
dbo.VarLastMin('Data1','x1',90,'dDateTime',dDateTime) from dbo.Data1
```

Result
Var field X1 from the result set for each record based on records located in the last N minutes relative to the time stamp of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
N	Long	The size of time window to Var in terms of minutes.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.48 VarLastN – Var of a field based on Last N records

Description

Calculates the Var of a field in a query result set based on records from the last N records.

Var will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example

```
select dbo.Data1.dDateTime, dbo.Data1.X1,
dbo.VarLastN('Data1','x1',3,'Id',Id) from dbo.Data1
```

Result

Stum field X1 from the result set for each record based on records located in the last N records relative to the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
N	int	The size of time window to Var in terms of number of records.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.49 VarTimeWindow – Var of a field based on records located in a relative time window

Description
Calculates the Var of a field in result set, based on records located in a relative time window.
Var will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example
```
select dDateTime, X1,
dbo.VarTimeWindow('Data1','x1',90,60,'dDateTime',dDateTime) from dbo.Data1
```

Result
Var field X1 from the result set for each record based on records located in a time window which start 90 minutes before current record and ends 60 minutes before current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
varName	String	Field name
fromMinutesAgo	long	The start point of the time window relative to current record.
toMinutesAgo	long	The end point of the time window relative to current record.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.50   VarPLagN – VarP of a field based on Lagged N field values

Description
Calculates the VarP of a field in a query result set based on the last N records.

VarP will include first and last record in the lagged selected records.
In case no records were found (or in case of exception) function returns null.

Example
```
select Id, X1, VarPLagN('Data1','x1',4,2,'Id',Id) as VarP1 from Data1
```

Result
VarP field X1 from the result set for each record based on records located between the 4th and the 2nd location relative to the location of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
VarPName	String	Field name
fromN	int	The starting record to VarP relative to the position of the current record in the result set.
toN	int	The ending record to VarP relative to the position of the current record in the result set.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.51 VarPLastMin – VarP of a field based on Last N minutes records

Description
Calculates the VarP of a field in a query result set based on records from the last N minutes.
VarP will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example
```
select dDateTime, X1,
dbo.VarPLastMin('Data1','x1',90,'dDateTime',dDateTime) from dbo.Data1
```

Result
VarP field X1 from the result set for each record based on records located in the last N minutes relative to the time stamp of the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
VarPName	String	Field name
N	Long	The size of time window to VarP in terms of minutes.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.

4.52   VarPLastN – VarP of a field based on Last N records

Description
Calculates the VarP of a field in a query result set based on records from the last N records.

VarP will include first and last record in the selected records.

In case no records were found (or in case of exception) function returns null.

Example
```
select dbo.Data1.dDateTime, dbo.Data1.X1,
dbo.VarPLastN('Data1','x1',3,'Id',Id) from dbo.Data1
```

Result
Stum field X1 from the result set for each record based on records located in the last N records relative to the current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
VarPName	String	Field name
N	int	The size of time window to VarP in terms of number of records.
IdFieldName	String	The name of the field that holds the records id number
Id	int	The value of the current record id number.

4.53 VarPTimeWindow – VarP of a field based on records located in a relative time window

Description

Calculates the VarP of a field in result set, based on records located in a relative time window.
VarP will include first and last record in the selected records.
In case no records were found (or in case of exception) function returns null.

Example

```
select dDateTime, X1,
dbo.VarPTimeWindow('Data1','x1',90,60,'dDateTime',dDateTime) from
dbo.Data1
```

Result

VarP field X1 from the result set for each record based on records located in a time window which start 90 minutes before current record and ends 60 minutes before current record.

Inputs details

Input name	Input type	Description
tableName	String	Table name
VarPName	String	Field name
fromMinutesAgo	long	The start point of the time window relative to current record.
toMinutesAgo	long	The end point of the time window relative to current record.
TimeFieldName	String	The name of the field that holds the records id number
theDateTime	DateTime	The Datetime value of the current record.