

EXAMPLE - Trigonometry Hyperbolic Functions

This example illustrates how to apply hyperbolic trigonometric functions to your transformations. All of the functions take inputs in radians.

Functions:

Item	Description
SINH Function	Computes the hyperbolic sine of an input value for a hyperbolic angle measured in radians. The value can be a Decimal or Integer literal or a reference to a column containing numeric values.
COSH Function	Computes the hyperbolic cosine of an input value for a hyperbolic angle measured in radians. The value can be a Decimal or Integer literal or a reference to a column containing numeric values.
TANH Function	Computes the hyperbolic tangent of an input value for a hyperbolic angle measured in radians. The value can be a Decimal or Integer literal or a reference to a column containing numeric values.

The following functions can be computed based on the inverse of the above functions:

- Hyperbolic Cotangent. Computed as $1/\text{TANH}$.
- Hyperbolic Secant. Computed as $1/\text{COSH}$.
- Hyperbolic Cosecant. Computed as $1/\text{SINH}$.

Also:

Item	Description
ROUND Function	Rounds input value to the nearest integer. Input can be an Integer, a Decimal, a column reference, or an expression. Optional second argument can be used to specify the number of digits to which to round.
RADIANS Function	Computes the radians of an input value measuring degrees of an angle. The value can be a Decimal or Integer literal or a reference to a column containing numeric values.
DIVIDE Function	Returns the value of dividing the first argument by the second argument. Equivalent to the $/$ operator.

Source:

In the following sample, input values are in degrees:

X
-30
0
30
45
60
90
120
135
180

Transformation:

In this example, all values are rounded to three decimals for clarity.

First, the above values in degrees must be converted to radians.

Transformation Name	New formula
Parameter: Formula type	Single row formula
Parameter: Formula	<code>round(radians(X), 3)</code>
Parameter: New column name	'rX'

Hyperbolic Sine:

Transformation Name	New formula
Parameter: Formula type	Single row formula
Parameter: Formula	<code>round(sinh(rX), 3)</code>
Parameter: New column name	'SINHrX'

Hyperbolic Cosine:

Transformation Name	New formula
Parameter: Formula type	Single row formula
Parameter: Formula	<code>round(cosh(rX), 3)</code>
Parameter: New column name	'COSHRX'

Hyperbolic Tangent:

Transformation Name	New formula
Parameter: Formula type	Single row formula
Parameter: Formula	<code>round(tanh(rX), 3)</code>
Parameter: New column name	'TANHrX'

Hyperbolic Cotangent:

Transformation Name	New formula
Parameter: Formula type	Single row formula
Parameter: Formula	<code>round(divide(1, tanh(rX)), 3)</code>
Parameter: New column name	'COTHrX'

Hyperbolic Secant:

Transformation Name	New formula
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Parameter: Formula type	Single row formula
Parameter: Formula	<code>round(divide(1, cosh(rX)), 3)</code>
Parameter: New column name	'SECHrX'

Hyperbolic Cosecant:

Transformation Name	New formula
Parameter: Formula type	Single row formula
Parameter: Formula	<code>round(divide(1, sinh(rX)), 3)</code>
Parameter: New column name	'CSCHrX'

Results:

X	rX	TANHrX	COTHrX	COSHRX	SECHrX	SINHRX	CSCHrX
-30	-0.524	-0.481	-2.079	1.14	0.877	-0.548	-1.825
0	0	0	<i>null</i>	1	1	0	<i>null</i>
30	0.524	0.481	2.079	1.14	0.877	0.548	1.825
45	0.785	0.656	1.524	1.324	0.755	0.868	1.152
60	1.047	0.781	1.28	1.6	0.625	1.249	0.801
90	1.571	0.917	1.091	2.51	0.398	2.302	0.434
120	2.094	0.97	1.031	4.12	0.243	3.997	0.25
135	2.356	0.982	1.018	5.322	0.188	5.227	0.191
180	3.142	0.996	1.004	11.597	0.086	11.553	0.087