

EXAMPLE - Trigonometry Hyperbolic Arc Functions

This example illustrates how to apply inverse (arc) hyperbolic functions to your transformations.

- **Hyperbolic arcsine.** See *ASINH Function*.
- **Hyperbolic arccosine.** See *ACOSH Function*.
- **Hyperbolic arctangent.** See *ATANH Function*.

Source:

In the following sample, input values are in radians. In this example, all values are rounded to two decimals for clarity.

Y
-4.00
-3.00
-2.00
-1.00
-0.75
-0.50
0.00
0.50
0.75
1.00
2.00
3.00
4.00

Transformation:

The following transformations include checks for the valid ranges for input values.

Hyperbolic arcsine:

Transformation Name	New formula
Parameter: Formula type	Single row formula
Parameter: Formula	<code>round(degrees(asinh(Y)), 2)</code>
Parameter: New column name	'asinhY'

Hyperbolic arccosine:

Valid over the range ($y > 1$)

Transformation Name	New formula
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Parameter: Formula type	Single row formula
Parameter: Formula	<code>if(Y>1,round(degrees(acos(Y)), 2),null())</code>
Parameter: New column name	'acoshY'

Hyperbolic arctangent:

Valid over the range $(-1 < y < 1)$

Transformation Name	New formula
Parameter: Formula type	Single row formula
Parameter: Formula	<code>if(abs(y)<1,round(degrees(atanh(Y)), 2),null())</code>
Parameter: New column name	'atanhY'

Results:

Y	atanhY	acoshY	asinhY
-4	<i>null</i>	<i>null</i>	-120.02
-3	<i>null</i>	<i>null</i>	-104.19
-2	<i>null</i>	<i>null</i>	-82.71
-1.5	<i>null</i>	<i>null</i>	-68.45
-1	<i>null</i>	<i>null</i>	-50.5
-0.75	-55.75	<i>null</i>	-39.71
-0.5	-31.47	<i>null</i>	-27.57
0	0	<i>null</i>	0
0.5	31.47	<i>null</i>	27.57
0.75	55.75	<i>null</i>	39.71
1	<i>null</i>	<i>null</i>	50.5
1.5	<i>null</i>	55.14	68.45
2	<i>null</i>	75.46	82.71
3	<i>null</i>	101	104.19
4	<i>null</i>	118.23	120.02