12.1.22 Editors - Geometry Nodes Editor - Header - Add Menu - Utilities

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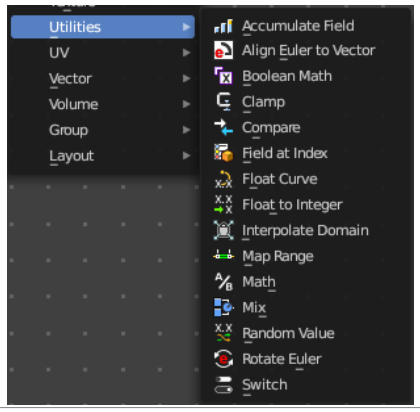
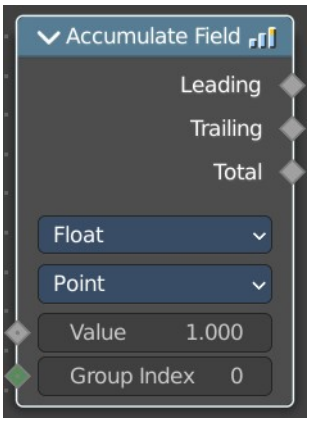
Add menu - Utilities

Utility nodes are mainly for mathematical operations.



Accumulate Field



Creates a running total of a given Vector, Float, or Int field.

Inputs

Value

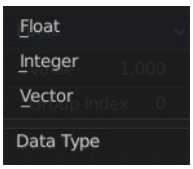
The field to be accumulated.

Group Index

The values of this input are used to aggregate the input into separate 'bins', creating multiple accumulations.

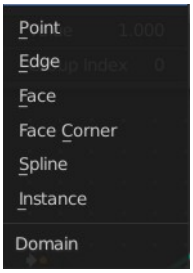
Properties

Data Type



What data type to work with.

Domain



From which domain to use the data.

Outputs

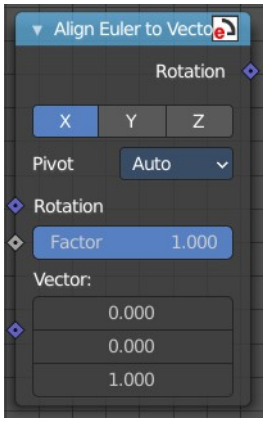
Leading and Trailing

Returns the running totals starting at either the first value of each accumulations or 0 if there is no data

Total

Returns the total accumulation at all positions of the field.

Align Euler to Vector



Aligns a euler value to a vector.

Inputs

Rotation

The input euler rotation vector.

Factor

The factor to align the euler value to the vector.

Vector

The vector to align to.

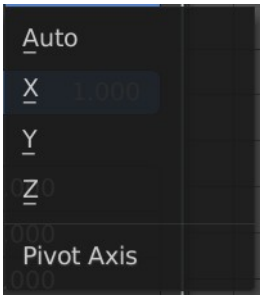
Properties

Align Axis

To which axis to align the vector.

Pivot

The pivot axis.

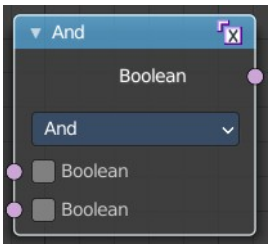


Output

Rotation

The output rotation euler angle.

Boolean Math



The Boolean Math node performs a basic logical operation between its inputs.

Inputs

Boolean

Two standard Boolean inputs.

Properties

Operation

And
True if both inputs are true.

Or
True if either or both inputs are true.

Not
True if both inputs are false.

Not And (NAND)
True when at least one input is false.

Nor (NOR)
True when both inputs are false.

Equal (XNOR)
True when both inputs are equal.

Not Equal (XOR)
True when both inputs are different.

Imply (IMPLY)
True unless the first input is true and the second is false.

Subtract (NIMPLY)
True when the first input is true and the second is false.

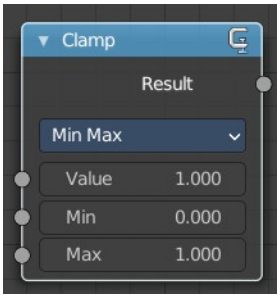
Output

Boolean

Standard Boolean output.

Clamp

Clamps a value between a minimum and a maximum.



Inputs

Value

The input value to be clamped.

Min

The minimum value.

Max

The maximum value.

Properties

Clamp Type

Min Max

Clamp values using Min and Max values.

Range

Clamp values between Min and Max range.

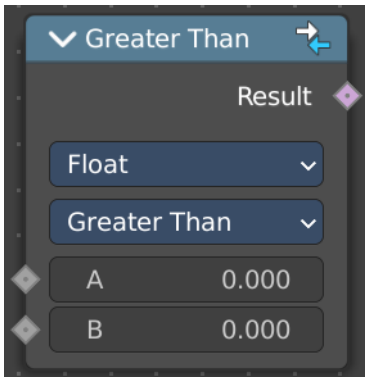
Outputs

Result

The input value after clamping.

Compare

The Compare node takes two inputs and does a math comparison between them.



Inputs

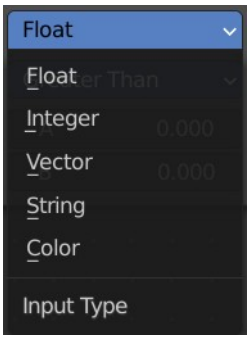
A, B

Standard float value input.

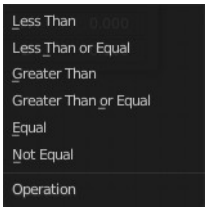
Properties

Input Type

What kind of data to compare.



Operation



A is less than B
True if A is smaller than B.

A is lesser than or equal B
True if A is smaller or equal than B.

A is greater than B
True if A is bigger than B.

A is greater than or equal B
True if A is bigger or equal than B.

A is equal B
True if A and B are the same.

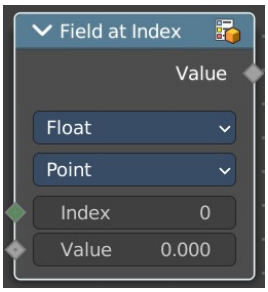
A is not equal B
True if A and B are different.

Output

Result

Standard Boolean output.

Field at Index



This node allows accessing data of other elements in the context geometry.
It is similar to the Transfer Attribute node in Index mode. The main difference is that this node does not require a geometry input, because the context is used.

Inputs

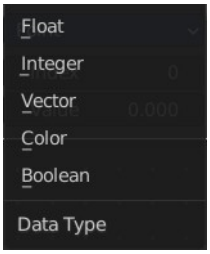
Index

Input Index.

Value

Input Value.

Properties

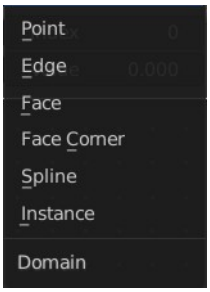


Data Type

What data type to calculate.

Domain

What geometry to calculate.



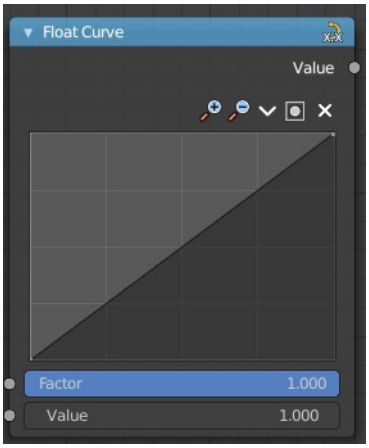
Output

Value

The output value.

Float Curve

The Float Curve node maps an input float to a curve and outputs a float value. This curve can then be used for profiles for example.



Inputs

Factor

How strong the input influences the output value.

Attribute

The input value.

Properties

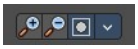
Curve Field

Channel buttons

Clicking on one of the channels displays the curve for each.

C (Combined RGB), R (Red), G (Green), B (Blue).

Navigation elements

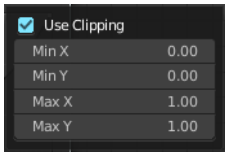


They are described from left to right.

Zoom in and out

The two buttons with the magnifying glass at it zooms in and out in the curve window.

Use Clipping



Clipping options. Set up clipping for the stroke.

Tools

Tools is a menu where you can find some curve related tools.

Reset View

Resets the curve windows zoom.

Extend horizontal

Extends the curve before the first curve point and behind the last curve point horizontally.

Extend extrapolated

Extends the curve before the first curve point and behind the last curve point extrapolated.

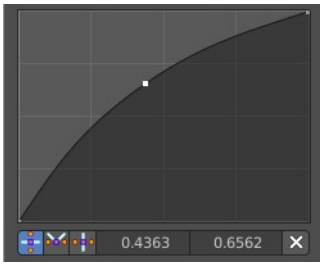
Reset Curve

Resets the curve to the initial shape.

Curve edit field

Create and tweak a Bezier curve that varies the input levels (X axis) to produce an output level (Y axis).

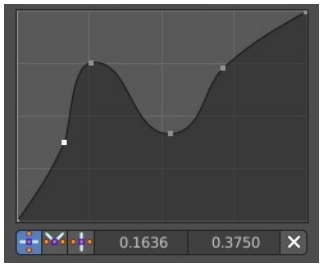
Selecting Points



You can select curve points. This reveals two edit boxes for the x and y coordinate of this point.

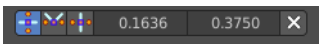
Selected points can be moved around. Left click at them, hold the mouse button down and move them to a new location.

Adding Points



You can add new curve points by simply left clicking at the curve. Move the mouse to position them where you need it.

Curve point settings



When you have a point selected then you will reveal further settings at the bottom.

Vector Handle

Set handle type to Vector.

Auto Handle
Set handle type to Auto.

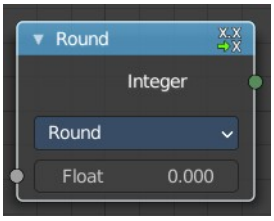
Auto Clamped Handle
Set handle type to Auto Clamped.

Output

Value

The output value.

Float to Integer



Converts a floating point value into an integer value.

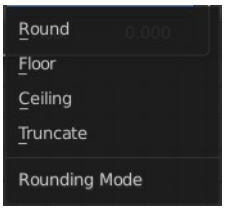
Inputs

Float

The input float value.

Properties

Rounding Mode



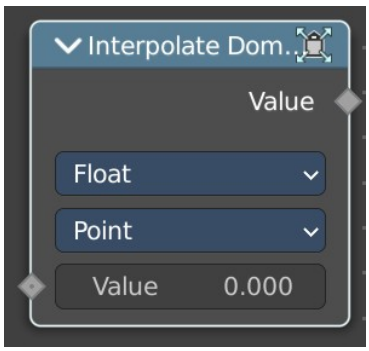
How the float value should be converted.

Outputs

Integer

The output integer value.

Interpolate on Domain



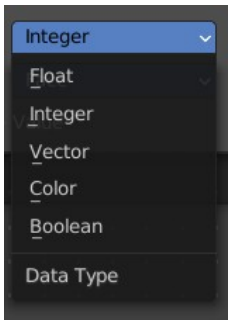
This node evaluates an existing field on a separate domain in a larger field context - an alternative to the Capture Attribute node. This nodes gets the field type of an existing field from the input socket and interpolates the field type as an array in the output socket.

Inputs

Value

The input value to get the field.

Properties

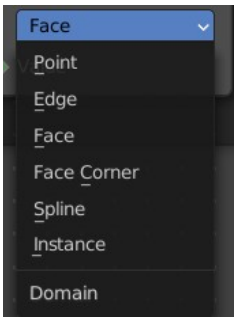


Data Type

Select the Data Type - which can be float, integer, vector, color and boolean.

Domain

The domain the Field evaluates. This gets and filters the field type. The domain can be point, edge, face, face corner, spline or instance.

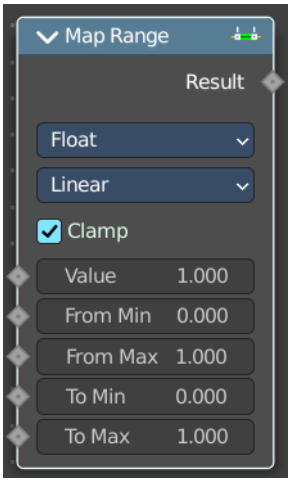


Outputs

Value

The output value.

Map Range



This node converts (maps) an input value range into a destination range. By default, values outside the specified input range will be proportionally mapped as well. This node is similar to Map Value node but provides a more intuitive way to specify the desired output range.

Inputs

Value

Standard value input.

From Min

Start of the input value range.

From Max

End of the input value range.

To Min

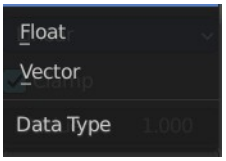
Startof the destination range.

To Max

End of the destination range.

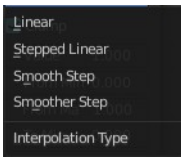
Properties

Data Type



The data type to calculate.

Interpolation Type



how to interpolate the values between min and max.

Clamp

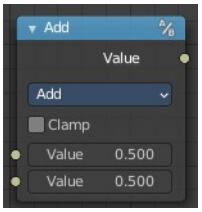
Clamps values to Min/Max of the destination range.

Outputs

Value

Standard value output.

Math



The Math Node performs math operations.

Inputs

The inputs of the node are dynamic. Some inputs are only available with certain operations. For example, the Addend input is only available in the Multiply Add operator.

Value

Input Value. Trigonometric functions read this value as radians.

Addend

Input Addend.

Base

Input Base.

Exponent

Input Exponent.

Epsilon

Input Epsilon.

Distance

Input Distance.

Min

Input Minimum.

Max

Input Maximum.

Increment

Input Increment.

Scale

Input Scale.

Degrees

Input Degrees.

Radians

Input Radians.

Properties

Operation

The mathematical operator to be applied to the input values:

Functions

Add

The sum of the two values.

Subtract

The difference between the two values.

Multiply

The product of the two values.

Divide

The division of the first value by the second value.

Multiply Add

The sum of the product of the two values with Addend.

Power

The Base raised to the power of Exponent.

Logarithm
The log of the value with a Base as its base.

Square Root
The square root of the value.

Inverse Square Root
One divided by the square root of the value.

Absolute
The input value is read with without regard to its sign. This turns negative values into positive values.

Exponent
Raises Euler’s number to the power of the value.

Comparison

Minimum
Outputs the smallest of the input values.

Maximum
Outputs the largest of two input values.

Less Than
Outputs 1.0 if the first value is smaller than the second value. Otherwise the output is 0.0.

Greater Than
Outputs 1.0 if the first value is larger than the second value. Otherwise the output is 0.0.

Sign
Extracts the sign of the input value. All positive numbers will output 1.0. All negative numbers will output -1.0. And 0.0 will output 0.0.

Compare
Outputs 1.0 if the difference between the two input values is less than or equal to Epsilon.

Smooth Minimum
Smooth Minimum.

Smooth Maximum
Smooth Maximum.

Rounding

Round
Round the input value to the nearest integer.

Floor
Rounds the input value down to the nearest integer.

Ceil
Rounds the input value up to the nearest integer.

Truncate
Outputs the integer part of the value.

Fraction
Fraction.

Modulo
Outputs the remainder once the first value is divided by the second value.

Wrap
Outputs a value between Min and Max based on the absolute difference between the input value and the nearest integer multiple of Max less than the value.

Snap
Round the input value to down to the nearest integer multiple of Increment.

Ping-pong
The output value is moved between 0.0 and the Scale based on the input value.

Trigonometric

Sine
The Sine of the input value.

Cosine
The Cosine of the input value.

Tangent
The Tangent of the input value.

Arcsine
The Arcsine of the input value.

Arccosine
The Arccosine of the input value.

Arctangent
The Arctangent of the input value.

Arctan2
Outputs the Inverse Tangent of the first value divided by the second value measured in radians.

Hyperbolic Sine
The Hyperbolic Sine of the input value.

Hyperbolic Cosine
The Hyperbolic Cosine of the input value.

Hyperbolic Tangent
The Hyperbolic Tangent of the input value.

Conversion

To Radians
Converts the input from degrees to radians.

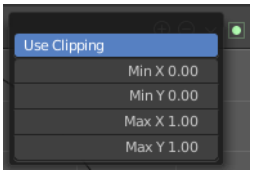
To Degrees
Converts the input from radians to degrees.

Clamp
Limits the output to the range (0.0 to 1.0). See Clamp.

Outputs

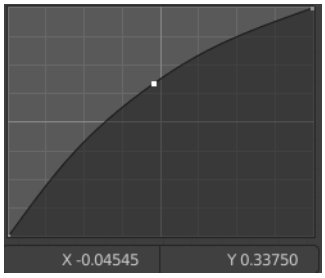
Value
Numerical value output.

Use Clipping
Clipping options. Set up clipping for the stroke.



Delete Points
Deletes selected curve point.

Curve window
Tweak and adjust the falloff curve by clicking at a curve point and dragging it around.



Double click adds a new point.

Holding down ctrl activates temporary snapping.

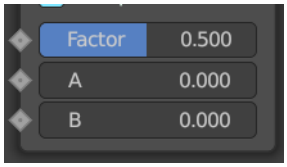
Holding down shift enables slower movement, which allows more accurate setting.

X / Y values
The x and y value of the currently selected point.

Mix

Allows to mix values and vectors in various ways. The node has three different modes. Float, Vector and Color

Input



Float

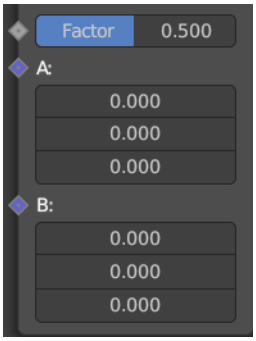
Factor
The mix factor.

A
Float value A input.

B
Float value B input.

Vector

Factor mode Uniform

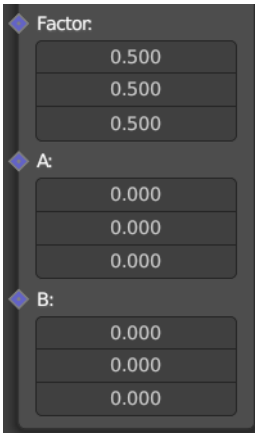


Factor
The mix factor.

A
Vector A input.

B
Vector B input.

Factor mode Non Uniform



Factor
The vector mix factor.

A
Vector A input.

B
Vector B input.

Color

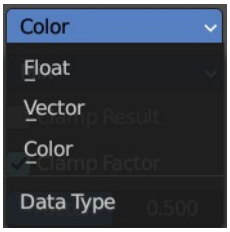
Factor
The mix factor.

A
Color A input.

B
Color B input.

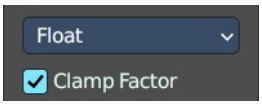
Properties

Data Type



Which mode to use.

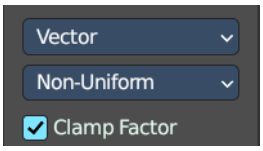
Float mode



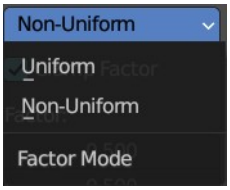
Clamp Factor

Clamp the factor to 0-1 range.

Vector mode



Factor mode

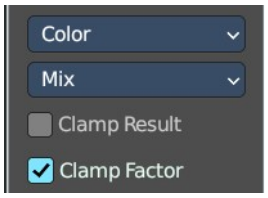


Uniform or non uniform factor.

Clamp Factor

Clamp the factor to 0-1 range.

Color mode



Blending mode

What blending mode to use for the color.

Clamp Result

Clamp the result to 0-1 range.

Clamp Factor

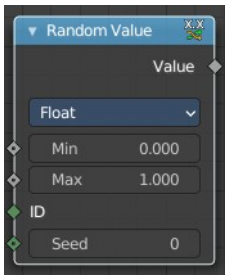
Clamp the input factor to 0-1 range.

Output

Result

The output value or vector.

Random Value



Generates a random value.

Input

Min

The minimum value of the range. This input is only available for Float, Integer, and Vector types.

Max

The maximum value of the range. This input is only available for Float, Integer, and Vector types.

ID

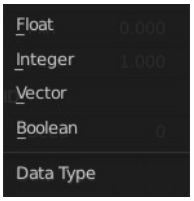
An ID to drive the random number generator seed. By default, this input uses the same value as if the ID Node, which is the id attribute of the context geometry if it exists, and otherwise the index.

Seed

The random seed for the random number generation.

Properties

Data Type



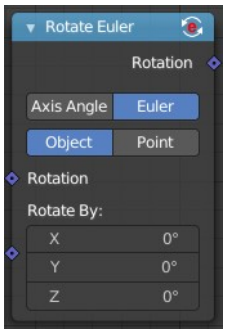
What kind of random value to create. The items should be self explaining.

Output

Value

The output value.

Rotate Euler



Rotates an euler rotation.

Inputs

Rotation

Use the rotation of an existing geometry.

Rotate By

The input rotation.

Properties

Rotate Type

Axis Angle
Rotate around an axis by an angle.

Euler
Rotate around the x, y and z axis.

Rotate Space

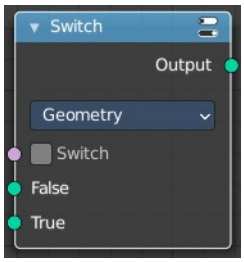
Object
Rotate points in the local space of the object.

Point
Rotate every point in its local space.

Outputs

Rotation
The euler angle output.

Switch



Switch between two inputs values based on a boolean.

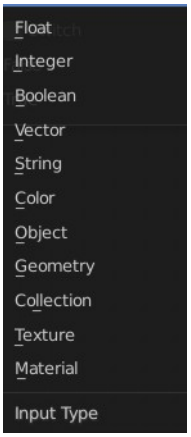
Inputs

Switch
The boolean switch.

A
The input value A. Used when the switch is off.

B
The input value B. Used when the switch is on.

Properties



Input Type

What input type the values are, which defines what type to output then.

Outputs

Output

Numerical value output.