numpy.arctanh

numpy.arctanh(*x*[, *out*]) = <*ufunc 'arctanh'*>

Inverse hyperbolic tangent element-wise.

Parameters: **x** *: array_like*
Input array.

Returns: **out** *: ndarray*
Array of the same shape as *x*.

See also:
emath.arctanh

Notes

arctanh is a multivalued function: for each *x* there are infinitely many numbers *z* such that *tanh(z) = x*. The convention is to return the *z* whose imaginary part lies in *[-pi/2, pi/2]*.

For real-valued input data types, arctanh always returns real output. For each value that cannot be expressed as a real number or infinity, it yields `nan` and sets the *invalid* floating point error flag.

For complex-valued input, arctanh is a complex analytical function that has branch cuts *[-1, -inf]* and *[1, inf]* and is continuous from above on the former and from below on the latter.

The inverse hyperbolic tangent is also known as *atanh* or `tanh^-1`.

References

Previous topic
numpy.arccosh (numpy.arccosh.html)

Next topic
numpy.around (numpy.around.html)

[R7] M. Abramowitz and I.A. Stegun, “Handbook of Mathematical Functions”, 10th printing, 1964, pp. 86. http://www.math.sfu.ca/~cbm/aands/ (http://www.math.sfu.ca/~cbm/aands/)

[R8] Wikipedia, “Inverse hyperbolic function”, http://en.wikipedia.org/wiki/Arctanh (http://en.wikipedia.org/wiki/Arctanh)

Examples

```
>>> np.arctanh([0, -0.5])                                                >>>
array([ 0.        , -0.54930614])
```