

Package ‘sigmoid’

July 23, 2025

Title Sigmoid Functions for Machine Learning

Version 1.4.0

Description Several different sigmoid functions are implemented, including a wrapper function, SoftMax preprocessing and inverse functions.

Depends R (>= 3.2.2)

Encoding UTF-8

License GPL-3

RoxygenNote 7.2.0

Suggests covr, knitr, rmarkdown, ggplot2, testthat

VignetteBuilder knitr

NeedsCompilation no

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Repository CRAN

Date/Publication 2022-06-18 14:40:02 UTC

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Gompertz	<i>Gompertz</i>
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Description

maps numeric vector using Gompertz function

Usage

Gompertz(x, a = 1, b = 1, c = 1)

Arguments

- | | |
|---|--------------|
| x | input vector |
| a | see details |
| b | see details |
| c | see details |

inverse_Gompertz	<i>Inverse Gompertz</i>
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Description

maps numeric vector using Gompertz function

Usage

inverse_Gompertz(x)

Arguments

- | | |
|---|------------------------------|
| x | input vector Gompertz values |
|---|------------------------------|

leakyrelu	<i>Leaky Rectified Linear Unit</i>
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Description

maps numeric vector using leaky ReLU function

Usage

leakyrelu(x)

Arguments

- | | |
|---|--------------|
| x | input vector |
|---|--------------|

logistic	<i>Standard Logistic</i>
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Description

maps numeric vector using logistic function

Usage

```
logistic(x, k = 1, x0 = 0)
```

Arguments

x	input vector
k	see details
x0	see details

logit	<i>Logit</i>
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Description

maps numeric vector using logit function

Usage

```
logit(x)
```

Arguments

x	input vector
---	--------------

relu	<i>Rectified Linear Unit</i>
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Description

maps numeric vector using ReLU function

Usage

```
relu(x)
```

Arguments

x	input vector
---	--------------

relu_output_to_derivative
<i>ReLU Derivative</i>

Description

Converts output of ReLU function to its derivative.

Usage

```
relu_output_to_derivative(x)
```

Arguments

x	vector or ReLU values
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sigmoid	<i>Sigmoid</i>
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Description

computes sigmoid nonlinearity

Usage

```
sigmoid(  
  x,  
  method = c("logistic", "Gompertz", "tanh", "ReLU", "leakyReLU"),  
  inverse = FALSE,  
  SoftMax = FALSE,  
  ...  
)
```

Arguments

x	numeric vector
method	type of sigmoid function
inverse	use the inverse of the method (reverses)
SoftMax	use SoftMax preprocessing
...	arguments to pass on the method

Examples

```
# create input vector
a <- seq(-10,10)

# use sigmoid with default standard logistic
( b <- sigmoid(a) )

# show shape
plot(b)

# inverse
hist( a - sigmoid(b, inverse=TRUE) )

# with SoftMax
( c <- sigmoid(a, SoftMax=TRUE) )

# show difference
hist(b-c)
```

sigmoid_output_to_derivative

Sigmoid Derivative

Description

Convert output of sigmoid function to its derivative.

Usage

sigmoid_output_to_derivative(x)

Arguments

x vector of sigmoid values

SoftMax	<i>SoftMax</i>
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Description

SoftMax preprocessing

Usage

SoftMax(x, lambda = 2)

Arguments

x	input vector
lambda	see details

SoftPlus	<i>SoftPlus</i>
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Description

maps numeric input vector using SoftPlus function

Usage

softplus(x)

Arguments

x	input vector
---	--------------

softplus_output_to_derivative
<i>SoftPlus Derivative</i>

Description

Convert output of SoftPlus function to its derivative.

Usage

softplus_output_to_derivative(x)

Arguments

x	vector of SoftPlus values
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`tanh_output_to_derivative`

Tanh Derivative

Description

Convert output of tanh function to its derivative.

Usage

`tanh_output_to_derivative(x)`

Arguments

`x` vector of tanh values

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