

Package ‘Rcatch22’

October 12, 2022

Type Package

Title Calculation of 22 Canonical Time-Series Characteristics

Version 0.2.1

Date 2022-06-03

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Description Calculate 22 summary statistics coded in C on time-series vectors to enable pattern detection, classification, and regression applications in the feature space as proposed by Lubba et al. (2019) <[doi:10.1007/s10618-019-00647-x](https://doi.org/10.1007/s10618-019-00647-x)>.

BugReports <https://github.com/hendersontrent/Rcatch22/issues/>

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Encoding UTF-8

LazyData true

Depends R (>= 3.5.0)

Imports rlang, stats, Rcpp (>= 0.12.15)

LinkingTo Rcpp

Suggests knitr, markdown, rmarkdown, testthat (>= 3.0.0)

RoxygenNote 7.1.1

VignetteBuilder knitr

Config/testthat/edition 3

NeedsCompilation yes

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Repository CRAN

Date/Publication 2022-06-03 08:50:28 UTC

R topics documented:

catch22_all	2
CO_Embed2_Dist_tau_d_expfit_meandiff	3
CO_f1ecac	4
CO_FirstMin_ac	4
CO_HistogramAMI_even_2_5	5
CO_trev_1_num	6
DN_HistogramMode_10	6
DN_HistogramMode_5	7
DN_Mean	8
DN_OutlierInclude_n_001_mdrmd	8
DN_OutlierInclude_p_001_mdrmd	9
DN_Spread_Std	10
FC_LocalSimple_mean1_ttauresrat	10
FC_LocalSimple_mean3_stderr	11
feature_list	12
IN_AutoMutualInfoStats_40_gaussian_fmml	12
MD_hrv_classic_pnn40	13
PD_PeriodicityWang_th0_01	13
SB_BinaryStats_diff_longstretch0	14
SB_BinaryStats_mean_longstretch1	15
SB_MotifThree_quantile_hh	15
SB_TransitionMatrix_3ac_sumdiagcov	16
SC_FluctAnal_2_dfa_50_1_2_logi_prop_r1	17
SC_FluctAnal_2_rsrangefit_50_1_logi_prop_r1	17
SP_Summaries_welch_rect_area_5_1	18
SP_Summaries_welch_rect_centroid	19
Index	20

catch22_all	<i>Automatically run every time-series feature calculation included in the catch22 set</i>
-------------	--

Description

Automatically run every time-series feature calculation included in the catch22 set

Usage

```
catch22_all(data, catch24 = FALSE)
```

Arguments

data	a numerical time-series input vector
catch24	a Boolean of whether to include mean and standard deviation as features

Value

object of class `DataFrame` that contains the summary statistics for each feature

Author(s)

Trent Henderson & Carl H. Lubba

Examples

```
data <- stats::rnorm(100)
outs <- catch22_all(data)
```

CO_Embed2_Dist_tau_d_expfit_meandiff

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
CO_Embed2_Dist_tau_d_expfit_meandiff(x)
```

Arguments

`x` a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- CO_Embed2_Dist_tau_d_expfit_meandiff(x)
```

`CO_f1ecac`*Function to calculate a statistical feature*

Description

Function to calculate a statistical feature

Usage

```
CO_f1ecac(x)
```

Arguments

`x` a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- CO_f1ecac(x)
```

`CO_FirstMin_ac`*Function to calculate a statistical feature*

Description

Function to calculate a statistical feature

Usage

```
CO_FirstMin_ac(x)
```

Arguments

`x` a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- CO_FirstMin_ac(x)
```

CO_HistogramAMI_even_2_5

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
CO_HistogramAMI_even_2_5(x)
```

Arguments

x a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- CO_HistogramAMI_even_2_5(x)
```

CO_trev_1_num *Function to calculate a statistical feature*

Description

Function to calculate a statistical feature

Usage

```
CO_trev_1_num(x)
```

Arguments

x a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- CO_trev_1_num(x)
```

DN_HistogramMode_10 *Function to calculate a statistical feature*

Description

Function to calculate a statistical feature

Usage

```
DN_HistogramMode_10(x)
```

Arguments

x a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- DN_HistogramMode_10(x)
```

DN_HistogramMode_5 *Function to calculate a statistical feature*

Description

Function to calculate a statistical feature

Usage

```
DN_HistogramMode_5(x)
```

Arguments

x a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- DN_HistogramMode_5(x)
```

DN_Mean

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
DN_Mean(x)
```

Arguments

x a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Trent Henderson

Examples

```
x <- stats::rnorm(100)
outs <- DN_Mean(x)
```

DN_OutlierInclude_n_001_mdrmd*Function to calculate a statistical feature*

Description

Function to calculate a statistical feature

Usage

```
DN_OutlierInclude_n_001_mdrmd(x)
```

Arguments

x a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- DN_OutlierInclude_n_001_mdrmd(x)
```

DN_OutlierInclude_p_001_mdrmd
Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
DN_OutlierInclude_p_001_mdrmd(x)
```

Arguments

x a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- DN_OutlierInclude_p_001_mdrmd(x)
```

`DN_Spread_Std`*Function to calculate a statistical feature*

Description

Function to calculate a statistical feature

Usage

```
DN_Spread_Std(x)
```

Arguments

`x` a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Trent Henderson

Examples

```
x <- stats::rnorm(100)
outs <- DN_Spread_Std(x)
```

`FC_LocalSimple_mean1_ttauresrat`*Function to calculate a statistical feature*

Description

Function to calculate a statistical feature

Usage

```
FC_LocalSimple_mean1_ttauresrat(x)
```

Arguments

`x` a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- FC_LocalSimple_mean1_ttauresrat(x)
```

FC_LocalSimple_mean3_stderr

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
FC_LocalSimple_mean3_stderr(x)
```

Arguments

x a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- FC_LocalSimple_mean3_stderr(x)
```

feature_list	<i>All features available in Rcatch22 in tidy format</i>
--------------	--

Description

The variables include:

Usage

```
feature_list
```

Format

A vector with 1 variable:

feature Name of the feature

IN_AutoMutualInfoStats_40_gaussian_fmmi	<i>Function to calculate a statistical feature</i>
---	--

Description

Function to calculate a statistical feature

Usage

```
IN_AutoMutualInfoStats_40_gaussian_fmmi(x)
```

Arguments

x a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- IN_AutoMutualInfoStats_40_gaussian_fmmi(x)
```

MD_hrv_classic_pnn40 *Function to calculate a statistical feature*

Description

Function to calculate a statistical feature

Usage

```
MD_hrv_classic_pnn40(x)
```

Arguments

x a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- MD_hrv_classic_pnn40(x)
```

PD_PeriodicityWang_th0_01

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
PD_PeriodicityWang_th0_01(x)
```

Arguments

x a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- PD_PeriodicityWang_th0_01(x)
```

SB_BinaryStats_diff_longstretch0

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
SB_BinaryStats_diff_longstretch0(x)
```

Arguments

x a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- SB_BinaryStats_diff_longstretch0(x)
```

`SB_BinaryStats_mean_longstretch1`*Function to calculate a statistical feature*

Description

Function to calculate a statistical feature

Usage

```
SB_BinaryStats_mean_longstretch1(x)
```

Arguments

`x` a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- SB_BinaryStats_mean_longstretch1(x)
```

`SB_MotifThree_quantile_hh`*Function to calculate a statistical feature*

Description

Function to calculate a statistical feature

Usage

```
SB_MotifThree_quantile_hh(x)
```

Arguments

`x` a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- SB_MotifThree_quantile_hh(x)
```

SB_TransitionMatrix_3ac_sumdiagcov

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
SB_TransitionMatrix_3ac_sumdiagcov(x)
```

Arguments

x a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- SB_TransitionMatrix_3ac_sumdiagcov(x)
```

SC_FluctAnal_2_dfa_50_1_2_logi_prop_r1
Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
SC_FluctAnal_2_dfa_50_1_2_logi_prop_r1(x)
```

Arguments

x a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- SC_FluctAnal_2_dfa_50_1_2_logi_prop_r1(x)
```

SC_FluctAnal_2_rsrangefit_50_1_logi_prop_r1
Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
SC_FluctAnal_2_rsrangefit_50_1_logi_prop_r1(x)
```

Arguments

x a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- SC_FluctAnal_2_rsrangefit_50_1_logi_prop_r1(x)
```

SP_Summaries_welch_rect_area_5_1

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
SP_Summaries_welch_rect_area_5_1(x)
```

Arguments

x a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- SP_Summaries_welch_rect_area_5_1(x)
```

`SP_Summaries_welch_rect_centroid`*Function to calculate a statistical feature*

Description

Function to calculate a statistical feature

Usage

```
SP_Summaries_welch_rect_centroid(x)
```

Arguments

`x` a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- SP_Summaries_welch_rect_centroid(x)
```

Index

* datasets

- feature_list, [12](#)

- catch22_all, [2](#)
- CO_Embed2_Dist_tau_d_expfit_meandiff,
[3](#)
- CO_f1ecac, [4](#)
- CO_FirstMin_ac, [4](#)
- CO_HistogramAMI_even_2_5, [5](#)
- CO_trev_1_num, [6](#)

- DN_HistogramMode_10, [6](#)
- DN_HistogramMode_5, [7](#)
- DN_Mean, [8](#)
- DN_OutlierInclude_n_001_mdrmd, [8](#)
- DN_OutlierInclude_p_001_mdrmd, [9](#)
- DN_Spread_Std, [10](#)

- FC_LocalSimple_mean1_ttauresrat, [10](#)
- FC_LocalSimple_mean3_stderr, [11](#)
- feature_list, [12](#)

- IN_AutoMutualInfoStats_40_gaussian_fmfi,
[12](#)

- MD_hrv_classic_pnn40, [13](#)

- PD_PeriodicityWang_th0_01, [13](#)

- SB_BinaryStats_diff_longstretch0, [14](#)
- SB_BinaryStats_mean_longstretch1, [15](#)
- SB_MotifThree_quantile_hh, [15](#)
- SB_TransitionMatrix_3ac_sumdiagcov, [16](#)
- SC_FluctAnal_2_dfa_50_1_2_logi_prop_r1,
[17](#)
- SC_FluctAnal_2_rsrangefit_50_1_logi_prop_r1,
[17](#)

- SP_Summaries_welch_rect_area_5_1, [18](#)
- SP_Summaries_welch_rect_centroid, [19](#)