Package 'Rcatch22'

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```
Title Calculation of 22 Canonical Time-Series Characteristics

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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 <doi:10.1007/s10618-019-00647-x>.

```
BugReports https://github.com/hendersontrent/Rcatch22/issues/
```

License GPL-3
Encoding UTF-8
LazyData true
Depends R (>= 3.5.0)

Type Package

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

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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 Roolean 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)</pre>
```

```
{\tt 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

Χ

a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

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

4 CO_FirstMin_ac

CO_f1ecac

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
CO_f1ecac(x)
```

Arguments

Χ

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_flecac(x)</pre>
```

CO_FirstMin_ac

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
CO_FirstMin_ac(x)
```

Arguments

Χ

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)</pre>
```

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

х

a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

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

CO_trev_1_num

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
CO_trev_1_num(x)
```

Arguments

Х

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)</pre>
```

DN_HistogramMode_10

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
DN_HistogramMode_10(x)
```

Arguments

Х

a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

```
DN_HistogramMode_5
```

Author(s)

Carl H. Lubba

Examples

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

DN_HistogramMode_5

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
DN_HistogramMode_5(x)
```

Arguments

Х

a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

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

DN_Mean

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
DN_Mean(x)
```

Arguments

Х

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)</pre>
```

 $DN_OutlierInclude_n_001_mdrmd$

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
DN_OutlierInclude_n_001_mdrmd(x)
```

Arguments

Х

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)</pre>
```

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

Х

a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

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

DN_Spread_Std

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
DN_Spread_Std(x)
```

Arguments

Х

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)</pre>
```

FC_LocalSimple_mean1_tauresrat

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
FC_LocalSimple_mean1_tauresrat(x)
```

Arguments

Х

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

Examples

```
x <- stats::rnorm(100)
outs <- FC_LocalSimple_mean1_tauresrat(x)</pre>
```

FC_LocalSimple_mean3_stderr

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
FC_LocalSimple_mean3_stderr(x)
```

Arguments

Х

a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

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

feature_list

All features available in Rcatch22 in tidy format

Description

The variables include:

Usage

feature_list

Format

A vector with 1 variable:

feature Name of the feature

 $In_AutoMutualInfoStats_40_gaussian_fmmi\\ Function\ to\ calculate\ a\ statistical\ feature$

Description

Function to calculate a statistical feature

Usage

```
IN_AutoMutualInfoStats_40_gaussian_fmmi(x)
```

Arguments

Х

a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

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

MD_hrv_classic_pnn40 Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
MD_hrv_classic_pnn40(x)
```

Arguments

Х

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)</pre>
```

```
PD_PeriodicityWang_th0_01
```

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
PD_PeriodicityWang_th0_01(x)
```

Arguments

Х

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)</pre>
```

 $SB_BinaryStats_diff_longstretch0$

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
SB_BinaryStats_diff_longstretch0(x)
```

Arguments

Х

a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

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

```
SB_BinaryStats_mean_longstretch1
```

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
SB_BinaryStats_mean_longstretch1(x)
```

Arguments

Х

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)</pre>
```

```
SB_MotifThree_quantile_hh
```

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
SB_MotifThree_quantile_hh(x)
```

Arguments

Х

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)</pre>
```

 $SB_Transition Matrix_3 ac_sum diagcov$

Function to calculate a statistical feature

Description

Function to calculate a statistical feature

Usage

```
SB_TransitionMatrix_3ac_sumdiagcov(x)
```

Arguments

Х

a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

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

```
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

Х

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)</pre>
```

```
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

Х

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)</pre>
```

```
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

Х

a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

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

```
{\tt 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

Х

a numerical time-series input vector

Value

scalar value that denotes the calculated time-series statistic

Author(s)

Carl H. Lubba

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

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