

# Package ‘ICSS’

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**Type** Package

**Title** ICSS Algorithm by Inclan/Tiao (1994)

**Version** 1.1

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**Description** The Iterative Cumulative Sum of Squares (ICSS) algorithm by In-clan/Tiao (1994) <<https://www.jstor.org/stable/2290916>> detects multiple change points, i.e. structural break points, in the variance of a sequence of independent observations. For series of moderate size (i.e. 200 observations and beyond), the ICSS algorithm offers results comparable to those obtained by a Bayesian approach or by likelihood ratio tests, without the heavy computational burden required by these approaches.

**License** GPL-2

**Depends** R (>= 3.5.0)

**Imports** rstack

**Suggests** testthat

**Encoding** UTF-8

**LazyData** true

**NeedsCompilation** no

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**Repository** CRAN

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## R topics documented:

data . . . . .	2
ICSS . . . . .	2
<b>Index</b>	<b>4</b>

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data	<i>Sample data for Inclan/Tiao (1994)</i>
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**Description**

Generated random data (n=700) with following the scheme in Inclan/Tiao (1994):

- [1;390]Mean: 0; Variance: 1.000
- [391;517]Mean: 0; Variance: 0.365
- [518;700]Mean: 0; Variance: 1.033

**Usage**

```
data(data)
```

**Examples**

```
## load data
data(data)

## calculate the variance until the first breakpoint.
data_var <- var(data[1:390])
```

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ICSS	<i>Iterative Cumulative Sum of Squares (ICSS)</i>
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**Description**

ICSS implements the Iterative Cumulative Sum of Squares (ICSS) algorithm by Inclan/Tiao (1994). The test detects structural breakpoints in the variance of time series data.

**Usage**

```
ICSS(data, demean = FALSE)
```

**Arguments**

data	A numerical vector
demean	An object of class " <b>logical</b> ": If demean is TRUE, all data will get demeaned prior to the ICSS algorithm.

**Value**

ICSS returns a numerical vector containing the location of structural breakpoints or NA if none breakpoints are found.

**References**

Inclan, C., & Tiao, G. C. (1994): Use of cumulative sums of squares for retrospective detection of changes of variance. *Journal of the American Statistical Association*, 89(427), 913-923. <https://www.jstor.org/stable/2290916>.

**Examples**

```
## load demo data
data(data)
breakpoints <- ICSS(data)
```

# Index

data, [2](#)

ICSS, [2](#)

logical, [2](#)