Package ‘spikes’

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Type Package
Title Detecting Election Fraud from Irregularities in Vote-Share Distributions
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Description Applies re-sampled kernel density method to detect vote fraud. It estimates the proportion of coarse vote-shares in the observed data relative to the null hypothesis of no fraud.
License GPL (>= 2)
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R topics documented:

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**confInt**

*Credible interval*

**Description**

Estimates credible interval by (1) taking a draw from the posterior density (2) implementing the RKD step. The procedure is repeated `boots` times.

**Usage**

```r
confInt(object, boots = 100)
```

**Arguments**

- `object`: object of class `out` returned by `spikes`
- `boots`: number of samples from the posterior; default `100`

---

**data**

*Example data*

**Description**

Synthetic dataset

**Usage**

```r
data("data")
```

**Format**

Precinct-level election data from the 2011 Canadian parliamentary elections.

- `N`: number of registered voters
- `t`: turnout
- `v`: votes for the Conservative party

**Examples**

```r
data(data)
```
**output**  

*Output object*

**Description**

An object of class `out` returned by `spikes` or `confint.out`.

**Usage**

```r
data("output")
```

**Examples**

```r
data(output)
plot(output)
```

---

**plot.out**  

*Plots output of spikes*

**Description**

Plots the observed kernel density of data and the upper envelope of the resampled densities.

**Usage**

```r
## S3 method for class 'out'
plot(x, main = NULL, ...)
```

**Arguments**

- `x`  
  Object of class `out`
- `main`  
  Title, NULL by default
- `...`  
  additional plotting arguments

**Examples**

```r
data(output)
plot(output)
```
spikes

Fraud-detection from vote-share data

Description

Implements the resampled kernel density method to detect the excess number of election results with coarse vote-shares (a coarse vote-share is a fraction with a low denominator).

Usage

spikes(data, resamples = 1000, bw = 1e-04, grid = 1001, out = NULL)

Arguments

data Data frame with three columns with names \( N \) (number of votes), \( t \) (number who turned out to vote), and \( v \) (number who voted for the party the votes of which are being analyzed). Returns error if columns are named incorrectly.

resamples Number of resamples; default 1000

bw Bandwidth for kernel density; default \( 0.0001 \)

grid Number of points on which the density is estimated; default 1001

out Object containing parameters of beta-mixture model. If spikes has been called earlier, then \( out = output \) will skip density estimation and proceed directly to resampling.

Value

spikes returns object of class \( out \).

fraud Estimated percentage of polling stations with fraud.

ymax Upper envelope of kernel density samples.

w Weights for each bin: the proportion of observations falling into a bin.

out Maximum likelihood estimates of the mixture beta binomial parameters for turnout and votes.

data Data used in estimation.

See Also

See Also \texttt{plot.out}, \texttt{summary.out}

Examples

data(data)

## Not run:
out <- spikes(data, resamples = 1000)

## End(Not run)
Internal functions

Description

Internal functions, should not be called by user

summary.out

Summarize

Description

Extracts estimate of fraud and 95 percent credible interval (if such is estimated) for the object of class out returned by spikes or confint.out.

Usage

## S3 method for class 'out'
summary(object, ...)

Arguments

- **object**: Object of class out
- **...**: additional arguments

Note

If the argument is from spikes, then summary returns degenerate credible interval, as it was not estimated. To return a proper credible interval, confint.out must take as its argument object returned by confint.out.

Examples

data(output)
summary(output)
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