Package ‘SPIn’

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Type Package

Title Simulation-efficient Shortest Probability Intervals

Version 1.1

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Depends R (>= 1.8.0), quadprog

Description An optimal weighting strategy to compute simulation-efficient shortest probability intervals (spins).

License GPL (>= 2)

NeedsCompilation no

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`SPIn-package` *Simulation Efficient Shortest Probability Intervals*

Description

Implement an optimal weighting strategy to compute simulation efficient shortest probability intervals (spin’s).

Details

Package:	SPIn
Type:	Package
Version:	1.1
Date:	2013-4-2
License:	GPL (>= 2)

This package contains functions for constructing and plotting simulation efficient shortest probability intervals.

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References

Simulation efficient shortest probability intervals. (arXiv:1302.2142)

bootSPIn *SPIn with Bootstrap*

Description

Compute the shortest probability interval (spin) using SPIn with bootstrap.

Usage

```
bootSPIn(x, n.boot = 50, conf = 0.95, bw = 0, lb = -Inf, ub = Inf, l = NA, u = NA)
```

Arguments

`x`	A vector of samples from the distribution.
`n.boot`	Number of bootstraps.
`conf`	Scalar, the confidence level desired.
`bw`	Scalar, the bandwidth of the weighting kernel in terms of sample points. If not specified, sqrt(n) will be used, where n is the sample size.
`lb,ub`	Scalars, the lower and upper bounds of the distribution. If specified, a pseudo-sample point equal to the corresponding bound will be added.
`l,u`	Scalars, weighting centers (if provided).

Details

spin.boot computes the shortest probability interval for a distribution using SPIn with bootstrap.

Value

spin.boot returns an object of `class` 'SPIn'. An object of class 'SPIn' is a list containing the following components:

`spin` A vector of length 2 with the lower and upper endpoints of the interval.

`conf` The confidence level.

`x` A vector of samples from the distribution.

`w.l,w.u` Vectors of the computed weights.

`l.l,l.u,u.l,u.u` Endpoints of the weights.

Note

This function assumes that the distribution is unimodal, and computes only 1 interval, not the set of intervals that are appropriate for multimodal distributions.

Author(s)

Ying Liu yliu@stat.columbia.edu

References

Simulation efficient shortest probability intervals. (arXiv:1302.2142)

See Also

`plot.SPIn`,`SPIn`

Examples

```
x <- rgamma(100,3)
bootSPIn(x)
```

`plot.SPIn` *Plot the Results from SPIn or bootSPIn*

Description

Plot the histogram, the kernel density estimate, the shortest probability interval and the central interval.

Usage

```
## S3 method for class 'SPIn'
plot(x, ...)
```

Arguments

`x` SPIn object, result of `SPIn` or `bootSPIn`.

`...` See `plot`.

Author(s)

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References

Simulation efficient shortest probability intervals. (arXiv:1302.2142)

See Also

`SPIn`,`bootSPIn`

Examples

```
x <- rgamma(100,3)
r <- bootSPIn(x)
plot(r)
```

`SPIn` *Simulation Efficient Shortest Probability Intervals*

Description

Compute the shortest probability interval (spin) using an optimal weighting strategy.

Usage

```
SPIn(x, conf = 0.95, bw = 0, lb = -Inf, ub = Inf, l=NA, u=NA)
```

Arguments

`x` A vector of samples from the distribution.

`conf` Scalar, the confidence level desired.

`bw` Scalar, the bandwidth of the weighting kernel in terms of sample points. If not specified, sqrt(n) will be used, where n is the sample size.

`lb,ub` Scalars, the lower and upper bounds of the distribution. If specified, a pseudo-sample point equal to the corresponding bound will be added.

`l,u` Scalars, weighting centers (if provided).

Details

SPIn computes the shortest probability interval for a distribution using an optimal weighting strategy. Quadratic programming is used to determine the optimal weights.

Value

SPIn returns an object of `class` 'SPIn'. An object of class 'SPIn' is a list containing the following components:

`spin` A vector of length 2 with the lower and upper endpoints of the interval.

`conf` The confidence level.

`x` A vector of samples from the distribution.

`w.l,w.u` Vectors of the computed weights.

`l.l,l.u,u.l,u.u`
Endpoints of the weights.

Note

This function assumes that the distribution is unimodal, and computes only 1 interval, not the set of intervals that are appropriate for multimodal distributions.

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References

Simulation efficient shortest probability intervals. (arXiv:1302.2142)

See Also

`bootSPIn`,`plot.SPIn`

Examples

```
x <- rgamma(100,3)
SPIn(x)
```

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