Package ‘simukde’

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**Description**

It finds the best fitting distribution from supported univariate continuous distributions for given data.

**Usage**

```r
find_best_fit(x, positive = FALSE, plot = TRUE,
               legend.pos = "topright")
```

**Arguments**

- **x**: a numeric vector; data.
- **positive**: a logical constant; distribution type.
- **plot**: a logical constant. If TRUE (default), a histogram and density lines are drawn.
- **legend.pos**: a character string. Indicates the legend position and must be one of "bottom-right", "bottom", "bottomleft", "left", "topleft", "top", "topright" (default), "right" and "center".

**Details**

This function is supported following univariate distributions:

- for positive random variables: Log normal, Exponential, Gamma and Weibull.
- for all random variables: Normal, Cauchy, Log normal, Exponential, Gamma, Weibull and Uniform.

Legends of the plot are ordered by p-values of the test.

**Value**

A list containing the following items:

- **distribution**: the name of the best fitting distribution.
- **ks.statistic**: the Kolmogorov-Smirnov test statistic for the distribution.
- **p.value**: the p-value of the test.
- **summary**: results similar to above for other distributions.
- **x**: given data.
- **n**: the sample size.
References


See Also

ks.test, fitdistr, hist

Examples

```r
petal.length <- datasets::iris$Petal.Length[datasets::iris$Species == "setosa"]
simukde::find_best_fit(x = petal.length, positive = TRUE)
```

Description

The simukde package provides a function which generates random values from a univariate and multivariate continuous distribution by using kernel density estimation based on a sample. The function uses the Accept-Reject method.

Note

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References


Simulation with Kernel Density Estimation
simulate_kde

Simulation with Kernel Density Estimation

Description

Generates random values from a univariate and multivariate continuous distribution by using kernel density estimation based on a sample. The function uses the Accept-Reject method.

Usage

```r
simulate_kde(x, n = 100, distr = "norm", const.only = FALSE,
              seed = NULL, parallel = FALSE, ...)
```

Arguments

- `x` a numeric vector, matrix or data frame; data.
- `n` integer; the number of random values will be generated.
- `distr` character; instrumental or candidate distribution name. See details.
- `const.only` logical; if TRUE, the constant of the Accept-Reject method will be returned.
- `seed` a single value, interpreted as an integer, or NULL (default).
- `parallel` logical; if TRUE parallel generator will be worked. FALSE is default.
- `...` other parameters for functions `kde`.

Details

Such function uses the function `kde` as kernel density estimator.

The Accept-Reject method is used to simulate random variables. Following code named distributions can be used as a value of the argument `distr` and an instrumental or candidate distribution of the simulation method. For univariate distributions:

- **norm** normal distribution (default), \((\infty, \infty)\)
- **cauchy** Cauchy distribution, \((-\infty, +\infty)\)
- **lnorm** log-normal distribution, \((0, +\infty)\)
- **exp** exponential distribution, \((0, +\infty)\)
- **gamma** gamma distribution, \((0, +\infty)\)
- **weibull** Weibull distribution, \((0, +\infty)\)
- **unif** uniform distribution, \((a, b)\)

And you can choose the best fitting instrumental distribution to simulate random variables more effectively by using `find_best_fit`. See examples.

For multivariate distributions, "norm" (multivariate normal distribution) is used.
**Value**

list of given data, simulated values, kernel density estimation and the constant of the Accept-Reject method when const.only is FALSE (default).

**References**


**See Also**

find_best_fit, kde

**Examples**

```r
## 1-dimensional data
data(faithful)
hist(faithful$eruptions)
res <- simukde::simulate_kde(x = faithful$eruptions, n = 100, parallel = FALSE)
hist(res$random.values)

## Simulation with the best fitting instrumental distribution
data(faithful)
par(mfrow = c(1, 3))
hist(faithful$eruptions)
fit <- simukde::find_best_fit(x = faithful$eruptions, positive = TRUE)
res <- simukde::simulate_kde(
  x = faithful$eruptions, n = 100,
  distr = fit$distribution, parallel = FALSE)
hist(res$random.values)
par(mfrow = c(1, 1))

## 2-dimensional data
data(faithful)
res <- simukde::simulate_kde(x = faithful, n = 100)
plot(res$kde, display = "filled.contour2")
points(x = res$random.values, cex = 0.25, pch = 16, col = "green")
points(x = faithful, cex = 0.25, pch = 16, col = "black")
```
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