

Package ‘psda’

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Title Polygonal Symbolic Data Analysis

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Description An implementation of symbolic polygonal data analysis. The package presents the estimation of main descriptive statistical measures, e.g. mean, covariance, variance, correlation and coefficient of variation.

In addition, transformation of the data in polygons. Empirical probability distribution function based on polygonal histogram and regression models are presented.

Depends R (>= 3.1)

License GPL-2

Imports ggplot2, rgeos, plyr, sp, raster, stats

LazyData true

RoxygenNote 6.0.1

Suggests testthat

NeedsCompilation no

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parea	<i>Polygonal Area</i>
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Description

Compute the area of polygon.

Usage

```
parea(polygon)
```

Arguments

polygon a matrix representing the polygon.

Value

a integer the area of polygon.

Examples

```
x <- psim(1, 3)
x <- x[[1]]
parea(x)
```

pconvex	<i>Convex verification</i>
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Description

Verify convexity of the polygons.

Usage

```
pconvex(polygon)
```

Arguments

polygon A matrix of dimension $l \times 2$ where l represent number of sides polygon.

Value

A boolean.

Examples

```
x <- psim(1,4)
x <- x[[1]]
pconvex(x)

x <- matrix(unlist(psim(1,4)), ncol= 2)
pconvex(x) #run
```

pcorr *Polygonal symbolic correlation*

Description

Compute the empirical correlation between two polygonal variables.

Usage

```
pcorr(polygons)
```

Arguments

polygons A list of matrices of dimension $l \times 2$ where l represent number of sides polygon.

Value

The method returns a integer.

Examples

```
x = psim(10, 3) #simulate 10 polygons of 3 sides
pcorr(x)
```

pcov

Polygonal symbolic covariance

Description

Compute the empirical covariance of two polygonal variables.

Usage

```
pcov(polygons)
```

Arguments

polygons A list of polygonal datas.

Value

The method returns a integer.

Examples

```
x <- psim(10, 3) #simulate 10 polygons of 3 sides
pcov(x)
```

pfreq

Polygonal Symbolic Relative Frequency

Description

Compute the bivariate relative frequency.

Usage

```
pfreq(pol)
```

Arguments

pol A list of matrices of dimension $l \times 2$, where l represent number of sides polygon.
This matrices represent the polygons.

Examples

```
x <- psim(10, 3) #simulate 10 polygons of 3 sides
frequency <- pfreq(x)
```

plr *Polygonal linear regression*

Description

plr is used to fit polygonal linear models.

Usage

```
plr(formula, env, residuals_type = "mse", intercept = TRUE)
```

Arguments

formula	an object of class "formula": a symbolic description of the model to be fitted.
env	environment that contain the variables of study.
residuals_type	type of residual, e.g., rmsd and mse residuals.
intercept	logical, if TRUE the model present intercept, otherwise it do not present intercept.

Value

beta_hat a vector of estimators for beta proposed in model.
SSRES sum square residuals.
SSREG sum square of regressions.
SST sum square toral.
residuals_type a type of residuals mse or rmsd.
prediction_polygons a list of prediction polygons by plr model.

Examples

```
require(psda)
yp <- psim(10, 4)
xp1 <- psim(10, 4)
xp2 <- psim(10, 4)
e <- new.env()
e$yp <- yp
e$xp1 <- xp1
e$xp2 <- xp2
fit <- plr(yp~xp1+xp2, env = e)
```

pmean *Polygonal empiric mean*

Description

Compute the polygonal empirical mean for polygonal variable.

Usage

```
pmean(polygons)
```

Arguments

polygons A list of matrices of dimension $l \times 2$ where l represent number of sides polygon.

Value

The method returns a vector containing the polygonal empiric mean of variable one and variable two, respectively.

Examples

```
x <- psim(10, 3) #simulate 10 polygons of 3 sides
pmean(x)
```

pmean_id *Polygonal symbolic internal mean*

Description

Compute the polygonal empirical mean for only one polygonal variable.

Usage

```
pmean_id(polygon)
```

Arguments

polygon a matrix representing the polygon.

Value

a polygonal empiric mean of a polygon.

Examples

```
x <- psim(1, 3)
x <- x[[1]]
pmean_id(x)
```

pplot *Plot polygonal symbolic variable*

Description

Prints all overlaid graphics in the display.

Usage

```
pplot(polygon)
```

Arguments

polygon A list of matrices with dimension 1 x 2 where 1 represents vertices number of polygon.

Examples

```
x <- psim(10, 3) #simulate 10 polygons of 3 sides
pplot(x)
```

psim *Polygonal symbolic data simulation*

Description

Function to create a polygonal data list.

Usage

```
psim(objects, vertices)
```

Arguments

objects number of objects simulated.
vertices number of vertex of the polygon

Value

A list of polygons.

Examples

```
psim(2, 3)
```

psmi	<i>Polygonal internam second moment</i>
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Description

Calculate polygonal second moment for polygonal data.

Usage

```
psmi(polygon)
```

Arguments

polygon a matrix that represents a polygonal variable.

Value

The internal variance.

Examples

```
x <- psim(1, 3) #simulate a polygon of 3 sides
psmi(x[[1]])
```

ptransform	<i>Polygon data transformation</i>
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Description

It transform labeled data in polygonal datas.

Usage

```
ptransform(data, vertices)
```

Arguments

data A data frame.
vertices integer that represent number of vertices of polygon.

Value

A list of matrices of dimension 1 x 2 where 1 represent number of vertices polygon transformed.

Examples

```

cat <- as.factor(sample(1:20, 1000, replace = TRUE))
cv <- runif(1000) #classical variable
cvc <- data.frame(category = cat, cv)
p <- ptransform(cvc, 4)

```

pvar

Polygonal symbolic variance

Description

Estimate the polygonal empirical variance between polygonal variables.

Usage

```
pvar(polygons)
```

Arguments

`polygons` A list of matrices of dimension $l \times 2$ where l represent number of sides polygon.

Value

The method returns a vector.

Examples

```

x <- psim(10, 3) #simulate 10 polygons of 3 sides
pvar(x)

```

pvari

Polygonal internal variance

Description

Calculate polygonal internal variance for polygonal data.

Usage

```
pvari(polygon)
```

Arguments

`polygon` a matrix that represents a polygonal variable.

Value

The internal variance.

Examples

```
x <- psim(1, 3) #simulate a polygons of 3 sides  
pvari(x[[1]])
```

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