Package: Rpcop (via r-universe)

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Type Package

Title Principal Curves of Oriented Points

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Description Principal curves generalize the notion of a first principal component to the case in which it is a nonlinear smooth curve. This package provides a function pcop(X) to compute principal curves with the algorithm defined in Delicado (2001) <doi:10.1006/jmva.2000.1917> from a data matrix X.

License GPL (>= 2)

Depends R (>= 3.5.0)

Imports Rcpp (>= 1.0.7), princurve

Suggests knitr, rmarkdown, testthat (>= 3.0.0)

LinkingTo Rcpp

VignetteBuilder knitr

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URL https://github.com/kmfrick/Rpcop

BugReports https://github.com/kmfrick/Rpcop/issues

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`pcop` *Principal Curve of Oriented Points*

Description

Computes a principal curve as defined in Delicado and Huerta (2003) doi:10.1007/s001800300145.

Usage

```
pcop(x, Ch = 1.5, Cd = 0.3, plot.true = FALSE, ...)
```

Arguments

`x`	A finite numeric matrix or data frame of n points in dimension p. Missing and infinite values are rejected.
`Ch`	The smoothing parameter h is C_H times the value given by the normal reference rule. Default value 1.5. Constraints $0.5 \leq C_H \leq 1.5$.
`Cd`	The distance between two consecutive principal oriented points in a PCOP is about C_D times the value of the smoothing parameter h. Default value 0.3. Constraints $0.25 \leq C_D \leq 0.5$.
`plot.true`	If `TRUE`, produce a two-dimensional plot of the resulting curve. Plotting requires at least two columns in `x`.
`...`	Additional parameters passed to `lines`.

Value

A list with two elements:

pcop.f1 Data frame storing the principal curve of oriented points in the original format, with columns `param`, `dens`, `span`, `orth.var`, `pop1`, `pop2`, . . . , `pr.dir1`, `pr.dir2`, . . .

pcop.f2 List conforming to the format used in **princurve**; see that package for details.

parameters List of algorithm parameters used for the fit.

input_names Input row and column names, if present. Other input attributes are not used by the algorithm and are not propagated.

call Matched function call.

Examples

```
n <- 500
p <- 3
x <- matrix(rnorm(n * p), ncol = p) %*% diag(p:1)
pcop(x, plot.true = FALSE)

x <- runif(100, -1, 1)
x <- cbind(x, x ^ 2 + rnorm(100, sd = 0.1))
pcop(x, plot.true = FALSE)
if (interactive()) {
  pcop(x, plot.true = TRUE, lwd = 4, col = 2)
}
```

`pcop-methods` *Methods for pcop objects*

Description

Print, summary, and plot methods for objects returned by `pcop()`.

Usage

```
## S3 method for class 'pcop'
print(x, ...)
## S3 method for class 'pcop'
summary(object, ...)
## S3 method for class 'summary.pcop'
print(x, ...)
## S3 method for class 'pcop'
plot(x, ...)
```

Arguments

`x`	A pcop or `summary.pcop` object.
`object`	A pcop object.
`...`	Additional arguments passed to methods. For `plot.pcop()`, arguments are passed to `graphics::plot`.

Value

`print.pcop()`, `print.summary.pcop()`, and `plot.pcop()` return their input invisibly. `summary.pcop()` returns a compact summary object.

Examples

```
set.seed(1)
x <- runif(100, -1, 1)
x <- cbind(x, x ^ 2 + rnorm(100, sd = 0.1))
fit <- pcop(x, plot.true = FALSE)

print(fit)
summary(fit)
if (interactive()) {
  plot(fit)
}
```

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