Package ‘CommonSplines’

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Title Regression Spline and Smoothing Spline

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Description This is an R package that covers commonly seem regression spline and smoothing spline. For regression spline, commonly seen basis functions are provided such as truncated power basis, natural spline basis and B-spline basis. For smoothing spline, penalties on second order derivative are provided, i.e., cubic smoothing spline.

Depends R (>= 3.3.2)

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Encoding UTF-8

LazyData true

RoxygenNote 6.0.1

R topics documented:

`bsplineBasis` *Regression using B-spline basis*

Description

This function provides nonparametric regressions using B-splines. The B-splines are defined following the recursive formulas due to de Boor. Only univariate input can be used.

Usage

```
bsplineBasis(x, y, x_test, order = 4, innerknots)
```

Arguments

`x` The input vector of training dataset.

`y` The output vector of training dataset.

`x_test` The input values at which evaluations are required.

`order` The order of B-spline functions. The default is order=4 for cubic B-splines.

`innerknots` The internal knots that define the spline.

Value

A list with the following components:

`beta` The coefficients of nonparametric regression.

`basis` The B-spline basis matrix of dimension c(length(x), df). df = length(innerknots) + order.

`f` The evaluated output at x_test.

Examples

```
x<-seq(0, 1, 0.001)
y <- x^3 * 3 - x^2 * 2 + x + exp(1)+rnorm(length(x),0,0.1)
plot(x,y)

innerknots <- c(0.1,0.2,0.3,0.4,0.5,0.6,0.7,0.8,0.9)
order<-4
x_test<-seq(0, 1, 0.01)

b_fit<-bspline(x,y,x_test,order,innerknots)

plot(x_test,b_fit$f)
lines(x_test,x_test^3 * 3 - x_test^2 * 2 + x_test + exp(1),col=”red”)

plot(x,rep(0,length(x)),type=”l”,ylim=c(0,1))
for (i in 1: (j+order)){
lines(x,b_fit$basis[,i])
}
```

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