# Package 'Kpart'

October 12, 2022

**Type** Package

**Title** Cubic Spline Fitting with Knot Selection

**Version** 1.2.2

**Date** 2018-05-16

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**Depends** leaps

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**Description** Cubic spline fitting along with knot selection, includes support for additional variables.

**License** GPL (>= 2)

**Repository** CRAN

**Date/Publication** 2018-05-18 03:42:57 UTC

**RoxygenNote** 5.0.1

**NeedsCompilation** no

## R topics documented:

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| Kpart-package | *Kpart* |

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#### Description

Cubic spline regression using the absolute maximum deviate to determine potential knots. This version also includes support for addidtional independednt variables to be included in the model.

#### Details

| Package: | Kpart |
|---|---|
| Type: | Package |
| Version: | 1.2.2 |
| Date: | 2012-08-02 |
| License: | Open Source |

~~ This package is intended for use with non-linearly associated data. The function part firsts selects points for cubic spline knots using an algorithm to find the absolute maximum deviate from the partition mean, then fits a best fitting model by using the best subset method and maximum adjR2. The function returns the values selected as knots in the model. The function part(d, outcomeVariable, splineTerm, additionalVars = NULL, K) takes five arguments. K is a positive integer that indicates how many equally spaced partitions the user would like to search.~~

– Recent update includes support for additional variables, 2016-07-23. –

### Author(s)

Eric Golinko

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### References

Golinko, Eric David. A min/max algorithm for cubic splines over k-partitions. Florida Atlantic University, 2012.

Golinko, Eric, and Lianfen Qian. "A Min. Max Algorithm for Spline Based Modeling of Violent Crime Rates in USA." arXiv preprint arXiv:1804.06806 (2018).

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| part | *Fits a linear model based on spline terms with additional support for other independent variables.* |
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### Description

The user will input a data frame, then designate the variable that is the outcome. Then the spline term is selected along with any other independent variables. Finally, a number K partitions is chosen for the algorithm to search for potential cubic spline knots based on the spline term and partition.

### Usage

```
part(d, outcomeVariable, splineTerm, additionalVars = NULL, K)
```

## Arguments

| | |
|---|---|
| `d` | A data frame data set with column names. |
| `outcomeVariable` | |
| | The variable from 'd' that is the outcome. |
| `splineTerm` | The spline term, inherited from 'd'. |
| `additionalVars` | A vector of additional variables to be included in the model. |
| `K` | The number of evenly spaced partitions to be searched. |

## Value

| | |
|---|---|
| `fits` | The fitted values of the linear model. |
| `xhat` | The entire feature matrix. |
| `coefs` | The significant coefficients of the model. |
| `adjr2` | The adjusted R^2 value. |

## Author(s)

Eric Golinko

## Examples

```
## for simple spline model.
data(LakeHuron)
d <- data.frame(seq(1875, 1972, 1), LakeHuron)
names(d) <- c('date', 'lh')
fit <- part(d = d, outcomeVariable = 'lh', splineTerm = 'date', K = 20)
fit
plot(d$date, d$lh)
lines(d$date, fit$fits, col = 'red')


## multivariate
data(freeny)
freeny$time <- as.numeric(rownames(freeny))
fit <- part(d = freeny, outcomeVariable = 'y',
    splineTerm = 'time', additionalVars = c('market.potential', 'income.level'), K =2)
fit$coefs
```

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