# Description

The mars function performs forward and backward stepwise regression to generate a model that minimizes the LOF criterion. It returns an object of class “mars” that can be used to generate a model of nonlinear relationships between a dependent variable and independent variables.

# Usage

mars(formula, data, control)

# Arguments

formula – data frame for formula

data – Matrix or dataframe containing data

control – A mars.control object. Default calls mars.control()

# Details

This implements Friedman’s Multivariate Adaptive Regression Splines (MARS). The function has three arguments: a regression formula, the raw data, and a mars.control object. The function calls fwd\_stepwise to perform forward stepwise regression to find the model with the lowest LOF. It then passes this output to bwd\_stepwise to perform backward stepwise regression to find the model with the lowest LOF. The output is a ‘mars’ object that contains a list of the call, formula, y, B, Bfuncs, x\_names, and components of the lm() function.

# Value

An S3 model of class “mars”. It is list with the following components: call, formula, y, B, Bfuncs, x\_names, and fit.

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# References

Friedman (1991) *Multivariate Adaptive Regression Splines* Annals of Statistics 19/1, 1–141 <http://projecteuclid.org/euclid.aos/1176347963>

Chapman & Hall (2nd edition) *Advanced R* <http://adv-r.had.co.nz/>

# See Also

anova.mars – An analysis of variance for mars objects

plot.mars – A plot containing cumulative distribution of residuals, residuals vs. fitted value, and residual QQ plot.

predict.mars – Based on predict.lm(), but creates a model frame based on the new data

print.mars – Prints the final model and value of the coefficients

summary.mars – Summary method for ‘mars’ objects

# Examples

# Ex 1.

dir <- ifelse(.Platform$OS.type=="unix",

"/Users/santiago/Library/CloudStorage/GoogleDrive-santi9608@gmail.com/My Drive/School/SFU/Upper Division/STAT360",

"C:/Users/guerr/Google Drive/School/SFU/Upper Division/STAT360")

load(paste0(dir, "/Project/marstestdata.rda"))

load(paste0(dir, "/Exercises/ProjectTestfiles/testthat/testmars.RData"))

load(paste0(dir, "/Exercises/ProjectTestfiles/testthat/testpredict.RData"))

predict.mars(testmars)

predict.mars(testmars, marstestdata)

all.equal(predict.mars(testmars), testpredict)

# Ex 2.

d <- mars(Limit ~ ., data = ISLR::Credit)

summary(d)

anova(d)

predict(d)

# Ex 3.

d <- mars(Sales ~ ., data = ISLR::Carseats)

print(d)

plot(d)