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Description Growth models and forest production require existing data manipulation and the creation of new data, structured from basic forest inventory data. The purpose of this package is provide functions to support these activities.

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`add.col` *add column*

Description

take a data-frame and a vector and combine by columns, respectively.

Usage

```
add.col(dataf, vec, namevec)
```

Arguments

`dataf`	dataframe
`vec`	vector
`namevec`	the names of the columns of vector

Value

dataf dataframe combined with the vector

atualizaCampoBase *updated base field*

Description

this function update certain fields in a dataframe, based on the provided key

Usage

```
atualizaCampoBase(camposAtualizar, baseAgrupada, baseAtualizar, keys,
  verbose = FALSE)
```

Arguments

camposAtualizar	is the vector you want to update
baseAgrupada	It is the database that contains the data you want to update on dataframe
baseAtualizar	It is dataframe that you want to change fields
keys	are the keys of the table that will be used in the compare
verbose	default false

Value

baseAtualizar with the updated fields according to baseAgrupada

avaliaAjuste *avalia Ajuste*

Description

this function evaluates the quality of the adjustment of the statistical model, rom observed data and those estimated by the model, observed

Usage

```
avaliaAjuste(dataFrame, variavelObservados, variavelEstimados,
  linear = TRUE, nParametros = NA, intercepto = TRUE, plot = NA,
  modelo = NA, resumo = FALSE, emf = TRUE)
```

Arguments

dataFrame	dataFrane with information observed, estimated
variavelObservados	vector of values observed.
variavelEstimados	vector of values estimated.
linear	boolean is linear model
nParametros	number of parameters used in the adjusted model
intercepto	if you model is no-intercepto use FALSE
plot	Vector graphic information
modelo	the name of the adjusted model
resumo	if you want summary information, use TRUE
emf	to save the graphic in the format emf use TRUE

---

avaliaEstimativas *calculate Estimates*

Description

given a list of observations and an estimated list of these observations this function evaluates how close it is the estimated value of observed and saves the differences

Usage

```
avaliaEstimativas(observado, estimado, estatisticas, ajuste = NULL,
  graficos = NULL, salvarEm = NULL, nome = "observadoXestimado")
```

Arguments

observado	list containing the observations of variable
estimado	list containing estimates of variable
estatisticas	list of arg to calc estatistics
ajuste	is ajust obtained a function like lm or nlsLM
graficos	list of arg to plot graphics
salvarEm	directory to save files
nome	name of files will be save

Value

will be returned

`avaliaVolumeAgeBased` *avalia Volume Age Based*

Description

this function evaluate volume based on ages

Usage

```
avaliaVolumeAgeBased(base, firstAge, lastAge, models, mapper = list(age1
  = "idade1", age2 = "idade2", dap1 = "dap1", dap2 = "dap2", dap2est =
  "dap2est", ht1 = "ht1", ht2 = "ht2", ht2est = "ht2est", volume1 =
  "volume1", volume2 = "volume2", volume2est = "volume2est"),
  groupBy = "parcela", save = NULL, percTraining = 0.7,
  paramEstatisticsDAP, paramEstatisticsHT, paramEstatisticsVolume,
  plot = "parcela", ageER = "^.*_", ageRound = NaN, ageInYears = F,
  forcePredict = F)
```

Arguments

`base`	the data base
`firstAge`	the first age to eval
`lastAge`	the last age to eval
`models`	list of exclusive for base models
`mapper`	mapper from labels of fields volume, dap, ht
`groupBy`	name field of base is group of individuals
`save`	list of param to save the files
`percTraining`	percentage that will be reserved for training (default 0.70)
`paramEstatisticsDAP`	parameters to pass to function 'fnAvaliaEstimativas'
`paramEstatisticsHT`	analogous to paramEstatisticsDAP
`paramEstatisticsVolume`	analogous to paramEstatisticsDAP
`plot`	is list of plots to function roundAges
`ageER`	regex used to discover age in names from dataframe in listOfdata
`ageRound`	synchronize begin of ages with an age? what age?
`ageInYears`	ages are in year?
`forcePredict`	force the calculation without using predict?

Value

will be returned a list of round ages

avaliaVolumeAvancado *evaluates Volume Advanced*

Description

this function performs an assessment of estimates of a variable as the forcefulness with expected

Usage

```
avaliaVolumeAvancado(base, mapeamento = list(dap1 = "dap1", dap2 =
  "dap2", ht1 = "ht1", ht2 = "ht2"), modelos = NULL, salvar = NULL,
  graficos = NULL, estatisticas = NULL, forcePredict = F,
  dividirEm = "parcela", percentualDeTreino = 0.7,
  agruparPor = "parcela", fnCalculaVolume = calculaVolumeDefault)
```

Arguments

base	data.frame with data
mapeamento	name of field eight and diameter
modelos	list of exclusive for base models
salvar	list of param to save the files
graficos	list of param to plot graphics
estatisticas	list of param to caclc estatistics
forcePredict	force the calculation without using predict?
dividirEm	how divide the base in training and validation
percentualDeTreino	how many percent will stay in the training group?
agruparPor	name field of base is group of individuals
fnCalculaVolume	list of estatistics results

Value

will be returned a result of statistics and ranking of volume

bias *Bias*

Description

In statistics, the bias (or bias function) of an estimator is the difference between this estimator's expected value and the true value of the parameter being estimated. An estimator or decision rule with zero bias is called unbiased. Otherwise the estimator is said to be biased.

Usage

```
bias(observados, estimados)
```

Arguments

observados	vector of values observed.
estimados	vector of values estimated.

Details

bias = (sum(estimados-observados))/length(observados)

References

see https://en.wikipedia.org/wiki/Bias_of_an_estimator for more details.

calculaA *Fator A*

Description

The linear intercept model,

Usage

```
calculaA(n, k)
```

Arguments

n	the size of the vector of regression model data
k	is the number of model parameters

Details

a = (n-1)/(n-k-1)

calculaPerc *calculates percentage*

Description

With this function, you can calculate the ratio of one quantity or magnitude relative to another evaluated in percentage.

Usage

```
calculaPerc(valor, observados)
```

Arguments

valor	number amount you to know the percentage
observados	number relationship to which you want to calculate the percentage, if it is a vector of integers is calculated its average.

Details

calculaPerc = ((valor)/mean(observados))*100

calculaVolumeDefault *calculates Volume Default*

Description

this function calculates the volume based on the height and volume of literature of the equation

Usage

```
calculaVolumeDefault(ht, dap, ...)
```

Arguments

ht	is list of height of individuals
dap	is list of diameter of individuals
...	only for compatibility with other functions

Value

will be returned a list of volume calc

ce *coefficient of efficiency*

Description

Nash Sutcliffe 1970 model efficiency coefficient is used to assess the predictive power of hydrological models.

Usage

```
ce(observados, estimados)
```

Arguments

observados	vector of values observed.
estimados	vector of regression model data.

References

(Nash and Sutcliffe, 1970) https://en.wikipedia.org/wiki/Nash-Sutcliffe_model_efficiency_coefficient for more details.

check.integer *Ckeck Integer*

Description

checks if a variable is integer

Usage

```
check.integer(x)
```

Arguments

x	any variable

Value

TRUE if "x" is integer, FALSE if "x" not is interger

Examples

```
x = 5
check.integer(x)
```

classificaClasseDAP *classifica Classe DAP*

Description

the center of the class that the DAP belongs.

Usage

```
classificaClasseDAP(dfClassesDAP, dap, getNhaClasse = FALSE,
  getNCLASSES = FALSE)
```

Arguments

dfClassesDAP	a frequency distribution with the attributes $classe and $centro
dap	integer Diameter at breast height
getNhaClasse	get NhaClasse field of dfClassesDAP, default false
getNCLASSES	get NCLASSES field of dfClassesDAP, default false

Examples

```
dados = defineClasses(1, 10, 2, getDataFrame = TRUE)
classificaClasseDAP(dados,7)
```

classificarDAP *classify field dap*

Description

classify field dap as specified amplitude and includes a few fields

Usage

```
classificarDAP(inventario, amplitude = 1, verbose = FALSE)
```

Arguments

inventario	the database to update
amplitude	it is amplitude of dap class
verbose	use TRUE to show status of process

Value

data.frame with classeDAP field and other

contemParametros *which parameters are missing?*

Description

this function checks whether the labels of the parameters list to move to the functions is sufficient

Usage

```
contemParametros(funcoes, parametro, addParametro = c(), addArgs = c(),
  exclui3pontos = T)
```

Arguments

funcoes	is a or set of functions whose param will be verify
parametro	is list whose labels is name of param in funcoes, list of args to funcoes ex list(a="1", b="2")
addParametro	list of param included
addArgs	more param required
exclui3pontos	verify por ... ? in f<-function(a, ...)

Value

will be returned the parameters that have not been reported in parametro and addParametro

converteCampoParaCharacter *Field Converts To Character*

Description

converts a column of a dataframe to String

Usage

```
converteCampoParaCharacter(nomeCampo, base)
```

Arguments

nomeCampo	the column name you want to convert
base	the column having dataFrame, that you want to convert to String

Value

base dataFrame with a column converted to String

Examples

```
measurement_date <- c(02/2009,02/2010,02/2011,02/2011)
plot <- c(1,2,3,4)
test <- data.frame(measurement_date,plot)
converteCampoParaCharacter("measurement_date",test)
```

`criaDadosPareados` *Create Date Paired*

Description

paired a dataframe

Usage

```
criaDadosPareados(dataFrame, campoChave, campoComparacao, camposPareados,
  camposNaoPareados, progress = TRUE)
```

Arguments

`dataFrame`	dataframe that you want to pair dataFrame must contain columns cod_id, ANO_MEDICAO1, ANO_MEDICAO2, DAP1, DAP2, HT1, HT2, ID_PROJETO
`campoChave`	character the column that will be paired
`campoComparacao`	character the field used to compare the period of change
`camposPareados`	vector the fields that will be paired exemple CampoesPareados=c(dap,ht)
`camposNaoPareados`	the fields he wants to be present without the paired
`progress`	if TRUE show a progress bar

Value

will be returned a dataframe containing columns cod_id, ANO_MEDICAO1, ANO_MEDICAO2, DAP1, DAP2, HT1, HT2, ID_PROJETO

criaModeloExclusivo *Create Exclusive Model for a database*

Description

this function returns a unique model is variable receive each mapeda variable ex .: criaModeloExclusivo (modeloCamposLeite, c ("age1", "age2", "bai1", "s"))

Usage

```
criaModeloExclusivo(modeloGenerico, variaveis, palpite = NULL)
```

Arguments

modeloGenerico	model of pattern criaModeloGenerico
variaveis	list of name fields (strings) in database and model, the order of variables matter
palpite	string containing start values of function of regression

Value

will be returned a function with exclusive model

criaModeloGenerico *Create function with generic model*

Description

This function creates a generic model that will be a funcao that has parameters for the variables that can be mapped to each different base. her return will be a generic model that should be mapped to be used by the function avaliaEstimativas

Usage

```
criaModeloGenerico(nome, formula, funcaoRegressao, variaveis,
  palpite = NULL, maisParametros = NULL, requires = NULL)
```

Arguments

nome	is the name of model
formula	is the string formula begin with y2~y1
funcaoRegressao	is the function that will make the regression, ex.: 'nlsLM'
variaveis	list variables that are present in the model that are field database
palpite	param start of funcaoRegressao
maisParametros	string add in funcaoRegressao, ex lm(y2~y1, data=base, maisParametros)
requires	list of string of packges used to work with funcaoRegressao

Value

will be returned function with generic model to map to a base

---

`defineClasses` *define Classes*

Description

creates a list with the class interval of a frequency distribution

Usage

```
defineClasses(limiteMin, limiteMax, amplitude, decrescente = TRUE,
  getDataFrame = FALSE, verbose = FALSE)
```

Arguments

`limiteMin`	the lowest list number
`limiteMax`	the largest number in the list
`amplitude`	List amplitude
`decrescente`	order by true decreasing , false increasing
`getDataFrame`	return a data.frame default false because old uses
`verbose`	show status default false

`defineClasses2` *define Classes 2*

Description

creates a list with the class interval of a frequency distribution

Usage

```
defineClasses2(dados, amplitude)
```

Arguments

`dados`	a vector of numbers
`amplitude`	integer Class amplitude range

Examples

```
dados <- c(1,2,3,4)
defineClasses2(dados,2)
```

estatisticas *Estatistics*

Description

this function returns a data.frame containing fields observado and estimado

Usage

```
estatisticas(observado, estimado, dfEstatisticas = NULL, ...)
```

Arguments

observado	list containing the observations of variable
estimado	list containing estimates of variable
dfEstatisticas	a data.frame
...	only for compatibility with other functions

Value

will be returned a list with data.frame with observado and estimado fields and other with statictcs of model add

estatisticasBIAS *BIAS Estatistics*

Description

this function returns a data.frame containing fields bias

Usage

```
estatisticasBIAS(observado, estimado, dfEstatisticas = NULL, ...)
```

Arguments

observado	list containing the observations of variable
estimado	list containing estimates of variable
dfEstatisticas	a data.frame
...	only for compatibility with other functions

Value

will be returned data.frame with bias

`estatisticasBiasPERCENTUAL` *percent BIAS Estatistics*

Description

this function returns a data.frame containing fields biasPERCENTUAL

Usage

```
estatisticasBiasPERCENTUAL(observado, estimado, dfEstatisticas, ...)
```

Arguments

`observado`	list containing the observations of variable
`estimado`	list containing estimates of variable
`dfEstatisticas`	a data.frame with field bias
`...`	only for compatibility with other functions

Value

will be returned data.frame with biasPERCENTUAL

`estatisticasCE` *CE Estatistics*

Description

this function returns a data.frame containing fields

Usage

```
estatisticasCE(observado, estimado, dfEstatisticas = NULL, ...)
```

Arguments

`observado`	list containing the observations of variable
`estimado`	list containing estimates of variable
`dfEstatisticas`	a data.frame
`...`	only for compatibility with other functions

Value

will be returned data.frame with CE

estatisticasCORR *Correlacion Estatistics*

Description

this function returns a data.frame containing fields corr

Usage

```
estatisticasCORR(observado, estimado, dfEstatisticas = NULL, ...)
```

Arguments

observado	list containing the observations of variable
estimado	list containing estimates of variable
dfEstatisticas	a data.frame
...	only for compatibility with other functions

Value

will be returned data.frame with corr field

estatisticasCorrPERCENTUAL *Percent Correlacion Estatistics*

Description

this function returns a data.frame containing fields corr_PERCENTUAL

Usage

```
estatisticasCorrPERCENTUAL(observado, estimado, dfEstatisticas, ...)
```

Arguments

observado	list containing the observations of variable
estimado	list containing estimates of variable
dfEstatisticas	a data.frame with corr field
...	only for compatibility with other functions

Value

will be returned data.frame with corr_PERCENTUAL field

estatisticasCV *Co variance Estatistics*

Description

this function returns a data.frame containing fields cv

Usage

```
estatisticasCV(observado, estimado, ajuste = NULL,
  dfEstatisticas = NULL, baseDoAjuste = NULL, formulaDoAjuste = NULL,
  ...)
```

Arguments

observado	list containing the observations of variable
estimado	list containing estimates of variable
ajuste	is ajust obtained a function like lm or nlsLM
dfEstatisticas	a data.frame
baseDoAjuste	data.frame optional
formulaDoAjuste	formula used in ajust
...	only for compatibility with other functions

Value

will be returned data.frame with cv

---

estatisticasCvPERCENTUAL *Percent Co variance Estatistics*

Description

this function returns a data.frame containing fields cvPERCENTUAL

Usage

```
estatisticasCvPERCENTUAL(observado, estimado, dfEstatisticas, ...)
```

Arguments

observado	list containing the observations of variable
estimado	list containing estimates of variable
dfEstatisticas	a data.frame with cv field
...	only for compatibility with other functions

Value

will be returned data.frame with cvPERCENTUAL

`estatisticasMAE` *MAE Estatistics*

Description

this function returns a data.frame containing fields mae

Usage

```
estatisticasMAE(observado, estimado, dfEstatisticas = NULL, ...)
```

Arguments

`observado`	list containing the observations of variable
`estimado`	list containing estimates of variable
`dfEstatisticas`	a data.frame
`...`	only for compatibility with other functions

Value

will be returned data.frame with mae

`estatisticasR2` *R2 Estatistics for linear models*

Description

this function returns a data.frame containing fields r2

Usage

```
estatisticasR2(observado, estimado, dfEstatisticas = NULL,
  ajuste = NULL, intercepto = TRUE, formulaDoAjuste = NULL,
  baseDoAjuste = NULL, ...)
```

Arguments

observado	list containing the observations of variable
estimado	list containing estimates of variable
dfEstatisticas	a data.frame
ajuste	is ajust obtained a function like lm or nlsLM
intercepto	intercepts?
formulaDoAjuste	formula used in ajust
baseDoAjuste	data.frame optional
...	only for compatibility with other functions

Value

will be returned data.frame with r2

---

estatisticasResiduoPERCENTUAL

Residuals Estatistics

Description

this function returns a data.frame containing field residuoPERCENTUAL

Usage

```
estatisticasResiduoPERCENTUAL(observado, estimado, dfEstatisticas = NULL,
  ...)
```

Arguments

observado	list containing the observations of variable
estimado	list containing estimates of variable
dfEstatisticas	a data.frame containing field residuo
...	only for compatibility with other functions

Value

will be returned data.frame with percent Residuals field

estatisticasResiduos *Residuals Estatistics*

Description

this function returns a data.frame containing field residuo

Usage

```
estatisticasResiduos(observado, estimado, dfEstatisticas = NULL, ...)
```

Arguments

observado	list containing the observations of variable
estimado	list containing estimates of variable
dfEstatisticas	a data.frame
...	only for compatibility with other functions

Value

will be returned data.frame with Residuals field

estatisticasRMSE *RMSE Estatistics*

Description

this function returns a data.frame containing fields rmse

Usage

```
estatisticasRMSE(observado, estimado, dfEstatisticas = NULL, ...)
```

Arguments

observado	list containing the observations of variable
estimado	list containing estimates of variable
dfEstatisticas	a data.frame
...	only for compatibility with other functions

Value

will be returned data.frame with RMSE calc

estatisticasRmsePERCENTUAL *percent RMSE Estatistics*

Description

this function returns a data.frame containing fields rmsePERCENTUAL

Usage

```
estatisticasRmsePERCENTUAL(observado, estimado, dfEstatisticas, ...)
```

Arguments

observado	list containing the observations of variable
estimado	list containing estimates of variable
dfEstatisticas	a data.frame containing field rmse
...	only for compatibility with other functions

Value

will be returned data.frame with rmse PERCENTUAL calc

estatisticasRRMSE *RRMSE Estatistics*

Description

this function returns a data.frame containing fields RRMSE

Usage

```
estatisticasRRMSE(observado, estimado, dfEstatisticas = NULL, ...)
```

Arguments

observado	list containing the observations of variable
estimado	list containing estimates of variable
dfEstatisticas	a data.frame
...	only for compatibility with other functions

Value

will be returned data.frame with rrmse

`evalAgeBased` *Evaluate Age Based*

Description

This function evaluates the volume of past data frames based on the parameter 'listOfdata'

Usage

```
evalAgeBased(listOfdata, mapper = list(volume2 = "volume2", volume2est =
  "volume2est", dap2 = "dap2", dap2est = "dap2est", ht2 = "ht2", ht2est =
  "ht2est"), fnAvaliaEstimativas = avaliaEstimativas,
  paramEstatisticsDAP, paramEstatisticsHT, paramEstatisticsVolume,
  titulos = "paste(\"Idade\", idade)", ageER = "^.*_",
  nameModel = NULL)
```

Arguments

`listOfdata`	the list that contains the data frames predicts
`mapper`	mapper from labels of fields volume, dap, ht
`fnAvaliaEstimativas`	funcion to evaluate dataframes of listOfdata
`paramEstatisticsDAP`	parameters to pass to function 'fnAvaliaEstimativas'
`paramEstatisticsHT`	analogous to paramEstatisticsDAP
`paramEstatisticsVolume`	analogous to paramEstatisticsDAP
`titulos`	customize titles of grafics
`ageER`	regex used to discover age in names from dataframe in listOfdata
`nameModel`	name of model used to predict to generate listOfdata optional

Value

will be returned a list of round ages

fator_bias *Fator Bias*

Description

The bias factor indicates the average of the observed values is above or below the equity line.

Usage

```
fator_bias(observados, estimados, n)
```

Arguments

observados	vector of values observed.
estimados	vector of values estimated.
n	the size of the vector of regression model data

Details

fator_bias = 10^(sum(log(estimados/observados)/n)) #' @references see https://www.sciencedirect.com/science/article/pii/S0165176599001949 for more details.

geraModelo *Generates function to work with a model*

Description

this function generates unique model given: A formula and a guess (optional: name, funcaoRegressao, maisParametros, requires - proidido: custom)] or[A string saying how the return will be obtained eg custom = "lm (dap2 dap1 ~ * b 0)" (if the formula can not be passed just go empty, ex .: formula = "")]

Usage

```
geraModelo(nome = "modelo sem nome", formula,
  funcaoRegressao = "nlsLM", palpite = NULL, maisParametros = NULL,
  requires = NULL, customizado = NULL)
```

Arguments

nome	is the name of model
formula	is the string formula begin with y2~y1
funcaoRegressao	is the function that will make the regression, ex.: 'nlsLM'
palpite	param start of funcaoRegressao
maisParametros	string add in funcaoRegressao, ex lm(y2~y1, data=base, maisParametros)
requires	list of string of packges used to work with funcaoRegressao
customizado	if you want to write as the return will be obtained report as a string

Value

will be returned a function with exclusive model

---

getAnoMedicao *Get Year Measurement*

Description

using column_name_measurement_date column in the form MM/YYYY creates a new column with the name "ANO_MEDICAO" in YYYY format

Usage

```
getAnoMedicao(dataFrame, column_name_measurement_date, column_name_plot)
```

Arguments

dataFrame	that has the column DATE(MM/YYYY) and a ID column_name_plot
column_name_measurement_date	column with a date format
column_name_plot	a column of dataFrame, identification of plot (ID_plot)

Value

dataFrame dataframe that has columns column_name_measurement_date, column_name_plot, ANO_MEDICAO

Examples

```
column_name_measurement_date <- c("02/2009","02/2010","02/2011","02/2012")
column_name_plot <- c(1,2,3,4)
test <- data.frame(column_name_measurement_date,column_name_plot)
getAnoMedicao(test,"column_name_measurement_date","column_name_plot")
```

getBaseOfAjust *get database Of Ajust*

Description

this function returns the database used in the setting

Usage

```
getBaseOfAjust(ajuste)
```

Arguments

ajuste	is ajust obtained a function like lm or nlsLM

Value

will be returned a string which is the database of ajust

getClasses *Get List of DAP Classes*

Description

this function return a list of data.frame where each contains a number of dap classes according to reported basis

Usage

```
getClasses(base, amplitude, verbose = FALSE)
```

Arguments

base	the data.frame containing fields limiteMin, limiteMax of parcela and idadearred
amplitude	it is amplitude of dap class
verbose	use TRUE to show status of process

Value

list of data.frame

getColumnsOfAjust *get Columns used in Ajust*

Description

this function returns an array with the column names that are on the model and reported basis or basis used in ajust

Usage

```
getColumnsOfAjust(ajuste, dfDados = NULL, excludeY1andY2 = T)
```

Arguments

ajuste	is ajust obtained a function like lm or nlsLM
dfDados	data.frame optional
excludeY1andY2	delete Y1 and Y2 fields? del formula(y1~y2...)

Value

will be returned list of columns used in ajust

getColumnsOfBase *get Columns Of Base present in the string*

Description

this function returns the columns of a base whose names are present in the string strColumns

Usage

```
getColumnsOfBase(base, strColumns)
```

Arguments

base	data.frame
strColumns	string containing name fields of the base

Value

will be returned list with fields whose name are present in the string

getFormulaExclusivaOfAjust *get Formula Exclusive Of Ajust*

Description

this function returns the formula of the model used in ajust

Usage

```
getFormulaExclusivaOfAjust(ajuste)
```

Arguments

ajuste	is ajust obtained a function like lm or nlsLM

Value

will be returned a string which is the formula of ajust

getggplot2GraphicObservadoXEstimado *Get ggplot2 Grapic observed versus estimated*

Description

this function displays/saves/returns a Graphical ggplot2 illustrating the difference between the observed and estimated

Usage

```
getggplot2GraphicObservadoXEstimado(titulo = "observadoXestimado",
  nome = "observadoXestimado", observado, estimado,
  identificadorIndividual = NULL, identificadorGrupal = NULL,
  showTestF = TRUE, TestFposition = 4,
  titleIdentificadorGrupal = NULL, save = NULL, labsX = "observado",
  labsy = "estimado", nomeParaExibir = NULL, environ = 1,
  extensao = ".png", ...)
```

Arguments

titulo	is the title graphic
nome	name of file case save
observado	list containing the observations of variable
estimado	list containing estimates of variable
identificadorIndividual	list containing 'id' of individuals
identificadorGrupal	list containing group of individuals
showTestF	draw results of test F in graphic?
TestFposition	show one of the four corners of the graph clockwise
titleIdentificadorGrupal	title of Legend of the groups
save	If you want to save enter the directory as a string
labsX	label x
labsy	label y
nomeParaExibir	This is the name to display the graph as a function after the completion of this
environ	environment in which the function to display the ggplot2 must be saved
extensao	type of image that will be saved
...	only for compatibility with other functions

Value

will be returned the graphical generated by ggplot2

---

getGraphicHistogram *Get Histogram of Residuals absolute*

Description

this function displays/saves a histogram graph illustrating the frequency of waste in classes

Usage

```
getGraphicHistogram(titulo = "residuos", nome = "observadoXestimado",
  estatisticas, save = NULL, vetorial = T, ...)
```

Arguments

titulo	is the title graphic
nome	name of file case save
estatisticas	data.frame containing field 'residuo'
save	If you want to save enter the directory as a string
vetorial	save picture in vector type? (Default TRUE)
...	only for compatibility with other functions

getGraphicObservadoXEstimado
Get Graphic Observed X Estimated

Description

this function display/save a graphic scatter.smooth illustrating the difference between the observed and estimated

Usage

```
getGraphicObservadoXEstimado(titulo = "observadoXestimado",
  nome = "observadoXestimado", observado, estimado, showTestF = TRUE,
  save = NULL, labsX = "observado", labsy = "estimado",
  vetorial = T, ...)
```

Arguments

titulo	is the title graphic
nome	name of file case save
observado	list containing the observations of variable
estimado	list containing estimates of variable
showTestF	draw results of test F in graphic?
save	If you want to save enter the directory as a string
labsX	label x
labsy	label y
vetorial	save picture in vector type? (Default TRUE)
...	only for compatibility with other functions

getGraphicResiduoAbs *Get Graphic Residuals absolute*

Description

this function displays/saves a graph illustrating the distribution scatter.smooth of residues

Usage

```
getGraphicResiduoAbs(titulo = "residuo absoluto",
  nome = "observadoXestimado", strVariavelXResiduo = NULL,
  estatisticas, save = NULL, labsX = "observacao",
  labsy = "residuos", vetorial = T, ...)
```

Arguments

titulo	is the title graphic
nome	name of file case save
strVariavelXResiduo	list containing variable for compare with residuals
estatisticas	data.frame containing field 'residuo'
save	If you want to save enter the directory as a string
labsX	label x
labsy	label y
vetorial	save picture in vector type? (Default TRUE)
...	only for compatibility with other functions

---

getGraphicResiduoPerc *Get Graphic Residuals percent*

Description

this function displays/saves a graph illustrating the distribution scatter.smooth of residues

Usage

```
getGraphicResiduoPerc(titulo = "Residuo Percentual (%)",
  nome = "observadoXestimado", strVariavelXResiduo = NULL,
  estatisticas, save = NULL, labsX = "observacao",
  labsy = "residuos", vetorial = T, ...)
```

Arguments

titulo	is the title graphic
nome	name of file case save
strVariavelXResiduo	list containing variable for compare with residuals
estatisticas	data.frame containing field 'residuoPERCENTUAL'
save	If you want to save enter the directory as a string
labsX	label x
labsy	label y
vetorial	save picture in vector type? (Default TRUE)
...	only for compatibility with other functions

getParametrosOfModel *get Parametros Of Model*

Description

this function retona columns the base of the parameter or setting present in the model

Usage

```
getParametrosOfModel(ajuste, base = NULL, formula = NULL)
```

Arguments

ajuste	is ajust obtained a function like lm or nlsLM
base	optional data.frame whose fields name is present in formula
formula	string containing name fields of the base

Value

will be returned list of columns used in ajust or in formula

ifrm *ifrm*

Description

if the object does not exist an error will not happen.

Usage

```
ifrm(obj, env = globalenv())
```

Arguments

obj	the object that you want to remove
env	The global environment

Examples

```
a = 5
ifrm(a)
ifrm(b)
```

isfinitedataframe *is finite data frame*

Description

check if a data.frame has any non-finite elements

Usage

```
isfinitedataframe(obj)
```

Arguments

obj	any object

Value

TRUE if "x" is finite, FALSE if "x" is not finite

Examples

```
date <- c("02/2009","02/2010","02/2011","02/2012")
x <- c(1,2,3,4)
test <- data.frame(x,date)
isfinitedataframe(test)
isfinitedataframe(x)
```

listToDataFrame *List to DataFrame*

Description

converts a list in a dataframe

Usage

```
listToDataFrame(dlist)
```

Arguments

dlist	a list

Examples

```
a <- 1:5
listToDataFrame(a)
b = listToDataFrame(a)
```

mae *mean absolute error (mae)*

Description

is a quantity used to measure how close forecasts or predictions are to the eventual outcomes. The mean absolute error is given by.

Usage

```
mae(observados, estimados)
```

Arguments

observados	vector of values observed.
estimados	vector of regression model data.

Details

mae = mean(abs(observados-estimados))

Value

Function that returns Mean Absolute Error

References

see https://en.wikipedia.org/wiki/Mean_absolute_error for more details.

mse *Mean squared error*

Description

the MSE is the mean of the square of the errors, corresponding to the expected value of the squared error loss or quadratic loss. The difference occurs because of randomness or because the estimator doesn't account for information that could produce a more accurate estimate.

Usage

```
mse(observados, estimados, k)
```

Arguments

observados	vector of values observed.
estimados	vector of regression model data.
k	the number of model parameters

Details

mse = (sum(estimados-observados)^2)/(length(observados)-k)

References

See https://en.wikipedia.org/wiki/Mean_squared_error for more details.

`mspr` *mspr*

Description

average square of the prediction errors .

Usage

```
mspr(observados, estimados, nValidacao)
```

Arguments

`observados`	vector of values observed.
`estimados`	vector of regression model data.
`nValidacao`	number of cases in the validation data set.

References

JESUS, S. C.; MIURA, A. K. Analise de regressao linear multipla para estimativa do indice de vegetacao melhorado (EVI) a partir das bandas 3 4 e 5 do sensor TM/Landsat 5. In: SIMPOSIO BRASILEIRO DE SENSORIAMENTO REMOTO, 14. (SBSR), 2009, Natal. Anais... Sao Jose dos Campos: INPE, 2009. p. 1103-1110. DVD, On-line. ISBN 978-85-17-00044-7. (INPE-15901-PRE/10511)

`predizer` *Predict*

Description

this function is the replacement predict, she tries to predict if the return zero predict it calculates the prediction with the coefficients reported in the parameter setting

Usage

```
predizer(ajuste, newdata, force = FALSE, ...)
```

Arguments

ajuste	is ajust obtained a function like lm or nlsLM
newdata	dataframe where fields will be update
force	force the calculation without using predict?
...	only for compatibility with other functions

Value

will be returned list of values predicts

---

projectBaseOriented *Project Base Oriented*

Description

this function build a list of dataframe with projects of ages between 'firstAge' and 'lastAge' params

Usage

```
projectBaseOriented(firstAge = NaN, lastAge = NaN, fitDAP, fitHT, base,
  mapper = list(age1 = "idadearred1", dap1 = "dap1", dap2 = "dap2", ht1 =
  "ht1", ht2 = "ht2"), calcVolume = calculaVolumeDefault,
  forcePredict = F)
```

Arguments

firstAge	the first age to predict
lastAge	the last age to predict
fitDAP	a fit get function inherit lm to DAP
fitHT	a fit get function inherit lm to HT
base	data base
mapper	the label used in fields to age, dap and ht
calcVolume	function to calc volume
forcePredict	force calc base coefficients or se predict()?

Value

will be returned a list of volume predict to ages in dataframe and/or param

R21a *R21a*

Description

To avoid any problems and confudion on the part of the data analyst, it seems a safe recommendation to use R21a consistently for any type of model with the appropeiate a value, rather than ajusting any of the other

Usage

```
R21a(observados, estimados, k)
```

Arguments

observados	vector of values observed.
estimados	vector of values estimated.
k	is the number of model parameters

Details

R21a <- 1-a*(1 - R21)

R29a *R29a*

Description

To avoid any problems and confusion on the part of the data analyst, it seems a safe recommendation to use R21a consistently for any type of model with the appropeiate a value, rather than adjusting any of the other.

Usage

```
R29a(observados, estimados, k)
```

Arguments

observados	vector of values observed.
estimados	vector of values estimated.
k	is the number of model parameters

Details

R29a <- 1-a*(1 - R29)

residuoPerc *calculates residue percentage*

Description

this function calculates the vector residue percentage.

Usage

```
residuoPerc(observados, estimados)
```

Arguments

observados	vector of values observed.
estimados	vector of values estimated.

Details

calculaPerc = ((valor)/mean(observados))*100

retornaValor *return value*

Description

this feature is designed to fix variables that its content was a command

Usage

```
retornaValor(valor)
```

Arguments

valor	any variable

Value

the variable converted to its value

Examples

```
a = 5
retornaValor(a)
```

rmse *Root Mean Square Error*

Description

The root-mean-square error (RMSE) is a frequently used measure of the differences between values (sample and population values) predicted by a model or an estimator and the values actually observed.

Usage

```
rmse(observados, estimados)
```

Arguments

observados	vector of values observed.
estimados	vector of regression model data.

Details

rmse = sqrt(mean((observados - estimados)^2))

References

See https://en.wikipedia.org/wiki/Root-mean-square_deviation for more details.

roundAge *Round Ages*

Description

this function approaching the age to the nearest age as an integer

Usage

```
roundAge(plots, ages, inYears = F, firstAge = NaN)
```

Arguments

plots	is list of plots
ages	is list of age
inYears	ages are in year?
firstAge	synchronize begin of ages with an age? what age?

Value

will be returned a list of round ages

rrmse *relative root mean square error*

Description

relative root mean square error (RRMSE) is calculated by dividing the RMSE by the mean observed data

Usage

```
rrmse(observados, estimados)
```

Arguments

observados	vector of values observed.
estimados	vector of regression model data.

salvaModelo *save function with Model*

Description

save function with Model of type criaModeloGenerico or criaModeloExclusivo

Usage

```
salvaModelo(modelo, diretorio = "")
```

Arguments

modelo	function with Model the save
diretorio	directory to save the file, if not informed saved in the work directory

separaDados *Data Separates*

Description

divides the dataFrame as the percentage defined in percTraining enabling apply and measure the performance of the regression equation.

Usage

```
separaDados(dataFrame, fieldName, percTraining = 0.7, seed = NULL)
```

Arguments

dataFrame	source of data
fieldName	column of dataFrame that will be applied regression
percTraining	percentage that will be reserved for training (default 0.70)
seed	integer that determines how the sample is randomly chosen (default NULL)

syx *Standard Error of Estimate*

Description

Measures the variability, or scatter of the observed values around the regression line

Usage

```
syx(observados, estimados, n, p)
```

Arguments

observados	vector of values observed.
estimados	vector of values estimated.
n	the amount of values observed
p	the size of the vector of regression model data

syxPerc *Standard Error of Estimate Percentage*

Description

Measures the variability, or scatter of the observed values around the regression line

Usage

```
syxPerc(syx, observados)
```

Arguments

syx	result of the function syx(Standard Error of Estimate).
observados	vector of values observed.

verificaTipoColuna *Check de type of Column*

Description

this function returns the type of a column of a dataFrame, if it is numeric or character.

Usage

```
verificaTipoColuna(coluna)
```

Arguments

coluna	column of dataframe

Examples

```
ID_REGIAO <- c(1,2,3,4)
CD_PLANTIO <- c("ACD","CDB","CDC","CDD")
test <- data.frame(ID_REGIAO,CD_PLANTIO)
verificaTipoColuna(test$ID_REGIAO)
```

whichmedian *whichmedian*

Description

vector position that has its closest median value

Usage

```
whichmedian(x)
```

Arguments

x	a vector of numbers

Value

vector position that has its closest median value

Examples

```
dados <- c(1,2,3,4,9,5,6)
whichmedian(dados)
```

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