

# Package ‘Fgmutils’

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**Type** Package

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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.

**License** GPL-2

**Depends** sqldf, stringr, plyr, R (>= 3.0)

**Imports** data.table, tcltk, utils, stats, graphics, devEMF, png,  
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---

add.col	<i>add column</i>
---------	-------------------

---

### 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	<i>updated base field</i>
-------------------	---------------------------

---

### 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	<i>avalia Ajuste</i>
--------------	----------------------

---

### 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	<i>Bias</i>
------	-------------

---

**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**

$$\text{bias} = (\text{sum}(\text{estimados} - \text{observados})) / \text{length}(\text{observados})$$
**References**

see [https://en.wikipedia.org/wiki/Bias\\_of\\_an\\_estimator](https://en.wikipedia.org/wiki/Bias_of_an_estimator) for more details.

---

calculaA	<i>Fator A</i>
----------	----------------

---

**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	<i>calculates percentage</i>
-------------	------------------------------

---

**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	<i>calculates Volume Default</i>
----------------------	----------------------------------

---

**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](https://en.wikipedia.org/wiki/Nash-Sutcliffe_model_efficiency_coefficient) for more details.

---

check.integer                      *Check 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 CamposPareados=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 mapped variable ex .: criaModeloExclusivo (modeloCamposLeite, c ("age1", "age2", "bai1", "s"))

### Usage

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

### Arguments

modeloGenerico     model of pattern criaModeloGenerico  
 variaveis           list of name fields (strings) in database and model, the order of variables matter  
 palpito             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,  
  palpito = 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  
 palpito            param start of funcaoRegressao  
 maisParametros    string add in funcaoRegressao, ex lm(y2~y1, data=base, maisParametros)  
 requires           list of string of packages used to work with funcaoRegressao

**Value**

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

---

defineClasses	<i>define Classes</i>
---------------	-----------------------

---

**Description**

creates a list with the class interval of a frequency distribution

**Usage**

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

**Arguments**

limiteMin	the lowest list number
limiteMax	the largest number in the list
amplitud	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	<i>define Classes 2</i>
----------------	-------------------------

---

**Description**

creates a list with the class interval of a frequency distribution

**Usage**

```
defineClasses2(dados, amplitud)
```

**Arguments**

dados	a vector of numbers
amplitud	integer Class amplitude range

**Examples**

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

---

estadisticas	<i>Estadistics</i>
--------------	--------------------

---

**Description**

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

**Usage**

```
estadisticas(observado, estimado, dfEstadisticas = NULL, ...)
```

**Arguments**

observado	list containing the observations of variable
estimado	list containing estimates of variable
dfEstadisticas	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 statistics of model add

---

estadisticasBIAS	<i>BIAS Estadistics</i>
------------------	-------------------------

---

**Description**

this function returns a data.frame containing fields bias

**Usage**

```
estadisticasBIAS(observado, estimado, dfEstadisticas = NULL, ...)
```

**Arguments**

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

**Value**

will be returned data.frame with bias

estadisticasBiasPERCENTUAL  
*percent BIAS Statistics*

**Description**

this function returns a data.frame containing fields biasPERCENTUAL

**Usage**

estadisticasBiasPERCENTUAL(observado, estimado, dfEstadisticas, ...)

**Arguments**

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

**Value**

will be returned data.frame with biasPERCENTUAL

estadisticasCE *CE Statistics*

**Description**

this function returns a data.frame containing fields

**Usage**

estadisticasCE(observado, estimado, dfEstadisticas = NULL, ...)

**Arguments**

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

**Value**

will be returned data.frame with CE

---

estadisticasCORR	<i>Correlacion Statistics</i>
------------------	-------------------------------

---

**Description**

this function returns a data.frame containing fields corr

**Usage**

```
estadisticasCORR(observado, estimado, dfEstadisticas = NULL, ...)
```

**Arguments**

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

**Value**

will be returned data.frame with corr field

---

estadisticasCorrPERCENTUAL	<i>Percent Correlacion Statistics</i>
----------------------------	---------------------------------------

---

**Description**

this function returns a data.frame containing fields corr\_PERCENTUAL

**Usage**

```
estadisticasCorrPERCENTUAL(observado, estimado, dfEstadisticas, ...)
```

**Arguments**

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

**Value**

will be returned data.frame with corr\_PERCENTUAL field

estadisticasCV            *Co variance Estatistics*

**Description**

this function returns a data.frame containing fields cv

**Usage**

```
estadisticasCV(observado, estimado, ajuste = NULL,
               dfEstadisticas = 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
dfEstadisticas	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

estadisticasCvPERCENTUAL  
*Percent Co variance Estatistics*

**Description**

this function returns a data.frame containing fields cvPERCENTUAL

**Usage**

```
estadisticasCvPERCENTUAL(observado, estimado, dfEstadisticas, ...)
```

**Arguments**

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

**Value**

will be returned data.frame with cvPERCENTUAL

---

estadisticasMAE	<i>MAE Statistics</i>
-----------------	-----------------------

---

**Description**

this function returns a data.frame containing fields mae

**Usage**

```
estadisticasMAE(observado, estimado, dfEstadisticas = NULL, ...)
```

**Arguments**

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

**Value**

will be returned data.frame with mae

---

estadisticasR2	<i>R2 Statistics for linear models</i>
----------------	--

---

**Description**

this function returns a data.frame containing fields r2

**Usage**

```
estadisticasR2(observado, estimado, dfEstadisticas = NULL,  
ajuste = NULL, intercepto = TRUE, formulaDoAjuste = NULL,  
baseDoAjuste = NULL, ...)
```

**Arguments**

observado list containing the observations of variable  
 estimado list containing estimates of variable  
 dfEstadisticas 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

---

*estadisticasResiduoPERCENTUAL*  
*Residuals Statistics*

---

**Description**

this function returns a data.frame containing field residuoPERCENTUAL

**Usage**

```
estadisticasResiduoPERCENTUAL(observado, estimado, dfEstadisticas = NULL,
...)
```

**Arguments**

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

**Value**

will be returned data.frame with percent Residuals field

---

**estadisticasResiduos** *Residuals Estatistics*

---

**Description**

this function returns a data.frame containing field residuo

**Usage**

```
estadisticasResiduos(observado, estimado, dfEstadisticas = NULL, ...)
```

**Arguments**

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

**Value**

will be returned data.frame with Residuals field

---

**estadisticasRMSE** *RMSE Estatistics*

---

**Description**

this function returns a data.frame containing fields rmse

**Usage**

```
estadisticasRMSE(observado, estimado, dfEstadisticas = NULL, ...)
```

**Arguments**

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

**Value**

will be returned data.frame with RMSE calc

estadisticasRmsePERCENTUAL  
*percent RMSE Estatistics*

**Description**

this function returns a data.frame containing fields rmsePERCENTUAL

**Usage**

estadisticasRmsePERCENTUAL(observado, estimado, dfEstadisticas, ...)

**Arguments**

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

**Value**

will be returned data.frame with rmse PERCENTUAL calc

estadisticasRRMSE *RRMSE Estatistics*

**Description**

this function returns a data.frame containing fields RRMSE

**Usage**

estadisticasRRMSE(observado, estimado, dfEstadisticas = NULL, ...)

**Arguments**

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

**Value**

will be returned data.frame with rmse

---

 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	<i>Fator Bias</i>
------------	-------------------

---

### 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

$fator\_bias = 10^{(\sum(\log(\text{estimados}/\text{observados})/n))}$  #' @references see <https://www.sciencedirect.com/science/article/pii/S0165176599001949> for more details.

---

geraModelo	<i>Generates function to work with a model</i>
------------	--

---

### 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", palpito = 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 pkgges 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	<i>Get Year Measurement</i>
---------------	-----------------------------

---

**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	<i>get database Of Ajust</i>
----------------	------------------------------

---

**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	<i>Get List of DAP Classes</i>
------------	--------------------------------

---

**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 returns 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	<i>mean absolute error (mae)</i>
-----	----------------------------------

---

**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](https://en.wikipedia.org/wiki/Mean_absolute_error) for more details.

---

mse	<i>Mean squared error</i>
-----	---------------------------

---

**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**

$$\text{mse} = (\text{sum}(\text{estimados} - \text{observados})^2) / (\text{length}(\text{observados}) - k)$$
**References**

See [https://en.wikipedia.org/wiki/Mean\\_squared\\_error](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 confusion on the part of the data analyst, it seems a safe recommendation to use R21a consistently for any type of model with the appropriate a value, rather than adjusting 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 appropriate 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	<i>calculates residue percentage</i>
-------------	--------------------------------------

---

**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	<i>return value</i>
--------------	---------------------

---

**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	<i>Root Mean Square Error</i>
------	-------------------------------

---

**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](https://en.wikipedia.org/wiki/Root-mean-square_deviation) for more details.

---

roundAge	<i>Round Ages</i>
----------	-------------------

---

**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	<i>relative root mean square error</i>
-------	--

---

**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	<i>save function with Model</i>
-------------	---------------------------------

---

**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

---

 separaDatos

*Data Separates*


---

### Description

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

### Usage

```
separaDatos(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	<i>Standard Error of Estimate Percentage</i>
---------	--

---

**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	<i>Check de type of Column</i>
--------------------	--------------------------------

---

**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)
```

---

<code>whichmedian</code>	<i>whichmedian</i>
--------------------------	--------------------

---

**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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