Package 'fdth'

August 29, 2016

Type Package

Title Frequency Distribution Tables, Histograms and Polygons

Version 1.2-1

Date 2015-04-09

Author José Cláudio Faria, Enio G. Jelihovschi and Ivan B. Allaman

Maintainer José Cláudio Faria <joseclaudio.faria@gmail.com>

Depends R (>= 2.6.0), stats, grDevices, graphics

Description Perform frequency distribution tables, associated histograms and polygons from vector, data.frame and matrix objects for numerical and categorical variables.

License GPL (>= 2)

Encoding latin1

LazyLoad yes

NeedsCompilation no

Repository CRAN

Date/Publication 2015-04-11 07:32:06

R topics documented:

`fdth-package` *Frequency distribution tables, histograms and polygons*

Description

The **fdth** package contains a set of functions which easily allows the user to make frequency distribution tables (‘`fdt`’), its associated histograms and frequency polygons (absolute, relative and cumulative). The ‘`fdt`’ can be formatted in many ways which may be suited to publication in many different ways (papers, books, etc). The `plot` method (S3) is the histogram which can be dealt with the easiness and flexibility of a high level function.

Details

The frequency of a particular observation is the number of times the observation occurs in the data. The distribution of a variable is the pattern of frequencies of the observation.

Frequency distribution table ‘`fdt`’ can be used for ordinal, continuous and categorical variables.

The `R` environment provides a set of functions (generally low level) enabling the user to perform a ‘`fdt`’ and the associated graphical representation, the histogram. A ‘`fdt`’ plays an important role to summarize data information and is the basis for the estimation of probability density function used in parametrical inference.

However, for novices or ocasional users of `R`, it can be laborious to find out all necessary functions and graphical parameters to do a normalized and pretty ‘`fdt`’ and the associated histogram ready for publications.

That is the aim of this package, i.e, to allow the user easily and flexibly to do both: the ‘`fdt`’ and the histogram. The most common input data for univariated is a `vector`. For multivariated data can be used both: a `data.frame`, in this case also allowing grouping all numerical variables according to one categorical, or `matrices`.

The simplest way to run ‘`fdt`’ and ‘`fdt_cat`’ is by supplying only the ‘`x`’ object, for example: `d <- fdt(x)`. In this case all necessary default values (‘`breaks`’ and ‘`right`’) ("Sturges" and `FALSE` respectively) will be used, if the ‘`x`’ object is categorical then just use `d <- fdt_cat(x)`.

If the varable is of contiuos type, you can also supply:

- ‘`x`’ and ‘`k`’ (number of class intervals);
- ‘`x`’, ‘`start`’ (left endpoint of the first class interval) and ‘`end`’ (right endpoint of the last class interval); or
- ‘`x`’, ‘`start`’, ‘`end`’ and ‘`h`’ (class interval width).

These options make the 'fdt' very easy and flexible.

The 'fdt' and 'fdt_cat' object store information to be used by methods summary, print and plot. The result of plot is a histogram or polygon (absolute, relative or cumulative). The methods summary, print and plot provide a reasonable set of parameters to format and plot the 'fdt' object in a pretty (and publishable) way.

Author(s)

José Cláudio Faria
Enio G. Jelihovschi
Ivan B. Allaman

See Also

hist provided by **graphics**; table, cut both provided by **base** and hist.data.frame provided by **Hmisc** package.

Examples

```
library (fdth)

#======================
# Vectors: univariated
#======================
x <- rnorm(n=1e3,
           mean=5,
           sd=1)

(tb <- fdt(x))

# Histograms
plot(tb)  # Absolute frequency histogram

plot(tb,
     main='My title')

plot(tb,
     x.round=3,
     col='darkgreen')

plot(tb,
     xlas=2)

plot(tb,
     x.round=3,
     xlas=2,
     xlab=NULL)

plot(tb,
     v=TRUE,
     cex=.8,
     x.round=3,
```

```
     xlas=2,
     xlab=NULL,
     col=rainbow(11))

plot(tb,
     type='fh')    # Absolute frequency histogram

plot(tb,
     type='rfh')   # Relative frequency histogram

plot(tb,
     type='rfph')  # Relative frequency (%) histogram

plot(tb,
     type='cdh')   # Cumulative density histogram

plot(tb,
     type='cfh')   # Cumulative frequency histogram

plot(tb,
     type='cfph')  # Cumulative frequency (%) histogram

# Polygons
plot(tb,
     type='fp')    # Absolute frequency polygon

plot(tb,
     type='rfp')   # Relative frequency polygon

plot(tb,
     type='rfpp')  # Relative frequency (%) polygon

plot(tb,
     type='cdp')   # Cumulative density polygon

plot(tb,
     type='cfp')   # Cumulative frequency polygon

plot(tb,
     type='cfpp')  # Cumulative frequency (%) polygon

# Density
plot(tb,
     type='d')     # Density

# Summary
tb

summary(tb)  # the same

print(tb)    # the same

show(tb)     # the same
```

```
summary(tb,
        format=TRUE)      # It can not be what you want to publications!

summary(tb,
        format=TRUE,
        pattern='%.2f')   # Huumm ..., good, but ... Can it be better?

summary(tb,
        col=c(1:2, 4, 6),
        format=TRUE,
        pattern='%.2f')   # Yes, it can!

range(x)                  # To know x

summary(fdt(x,
            start=1,
            end=9,
            h=1),
        col=c(1:2, 4, 6),
        format=TRUE,
        pattern='%d')     # Is it nice now?

# The fdt.object
tb[['table']]                       # Stores the feq. dist. table (fdt)
tb[['breaks']]                      # Stores the breaks of fdt
tb[['breaks']]['start']             # Stores the left value of the first class
tb[['breaks']]['end']               # Stores the right value of the last class
tb[['breaks']]['h']                 # Stores the class interval
as.logical(tb[['breaks']]['right'])  # Stores the right option

# Theoretical curve and fdt
y <- rnorm(1e5,
           mean=5,
           sd=1)

tb <- fdt(y,
          k=100)

plot(tb,
     type='d',                      # density
     col=heat.colors(100))

curve(dnorm(x,
            mean=5,
            sd=1),
      n=1e3,
      add=TRUE,
      lwd=4)

#============================================
# Data.frames: multivariated with categorical
#============================================
```

```
mdf <- data.frame(X1=rep(LETTERS[1:4], 25),
                  X2=as.factor(rep(1:10, 10)),
                  Y1=c(NA, NA, rnorm(96, 10, 1), NA, NA),
                  Y2=rnorm(100, 60, 4),
                  Y3=rnorm(100, 50, 4),
                  Y4=rnorm(100, 40, 4))

(tb <- fdt(mdf))

# Histograms
plot(tb,
     v=TRUE)

plot(tb,
     col=rainbow(8))

plot(tb,
     type='fh')

plot(tb,
     type='rfh')

plot(tb,
     type='rfph')

plot(tb,
     type='cdh')

plot(tb,
     type='cfh')

plot(tb,
     type='cfph')

# Poligons
plot(tb,
     v=TRUE,
     type='fp')

plot(tb,
     type='rfp')

plot(tb,
     type='rfpp')

plot(tb,
     type='cdp')

plot(tb,
     type='cfp')

plot(tb,
     type='cfpp')
```

```
# Density
plot(tb,
     type='d')

# Summary
tb

summary(tb)  # the same

print(tb)    # the same

show(tb)     # the same

summary(tb,
        format=TRUE)

summary(tb,
        format=TRUE,
        pattern='%05.2f')  # regular expression

summary(tb,
        col=c(1:2, 4, 6),
        format=TRUE,
        pattern='%05.2f')

print(tb,
      col=c(1:2, 4, 6))

print(tb,
      col=c(1:2, 4, 6),
      format=TRUE,
      pattern='%05.2f')

# Using by
levels(mdf$X1)

plot(fdt(mdf,
         k=5,
         by='X1'),
     col=rainbow(5))

levels(mdf$X2)

summary(fdt(iris,
            k=5),
        format=TRUE,
        patter='%04.2f')

plot(fdt(iris,
         k=5),
     col=rainbow(5))
```

```
levels(iris$Species)

summary(fdt(iris,
            k=5,
            by='Species'),
        format=TRUE,
        patter='%04.2f')

plot(fdt(iris,
         k=5,
         by='Species'),
     v=TRUE)

#=========================
# Matrices: multivariated
#=========================
summary(fdt(state.x77),
        col=c(1:2, 4, 6),
        format=TRUE)

plot(fdt(state.x77))

# Very big
summary(fdt(volcano,
            right=TRUE),
        col=c(1:2, 4, 6),
        round=3,
        format=TRUE,
        pattern='%05.1f')

plot(fdt(volcano,
         right=TRUE))
```

`fdt` *Frequency distribution table for numerical data*

Description

A S3 set of methods to easily perform frequency distribution table ('`fdt`') from `vector`, `data.frame` and `matrix` objects.

Usage

```
## S3 generic
fdt(x, ...)

## S3 methods
## Default S3 method:
fdt(x,
    k,
```

```
    start,
    end,
    h,
    breaks=c('Sturges', 'Scott', 'FD'),
    right=FALSE, ...)

## S3 method for class 'data.frame'
fdt(x,
    k,
    by,
    breaks=c('Sturges', 'Scott', 'FD'),
    right=FALSE, ...)

## S3 method for class 'matrix'
fdt(x,
    k,
    breaks=c('Sturges', 'Scott', 'FD'),
    right=FALSE, ...)
```

Arguments

x	A vector, data.frame or matrix object. If 'x' is data.frame or matrix it must contain at least one numeric column (fdt) or character/factor (fdt_cat).
k	Number of class intervals.
start	Left endpoint of the first class interval.
end	Right endpoint of the last class interval.
h	Class interval width.
by	Categorical variable used for grouping each numeric variable, useful only on data.frame.
breaks	Method used to determine the number of interval classes, c("Sturges", "Scott", "FD").
right	Right endpoints open (default = FALSE).
...	Potencial further arguments (required by generic).

Details

The simplest way to run 'fdt' is done by supplying only the 'x' object, for example: `nm <- fdt(x)`. In this case all necessary default values ('breaks' and 'right') ("Sturges" and FALSE respectively) will be used.

It can be provided also:

- 'x' and 'k' (number of class intervals);
- 'x', 'start' (left endpoint of the first class interval) and 'end' (right endpoint of the last class interval); or
- 'x', 'start', 'end' and 'h' (class interval width).

These options make the 'fdt' very easy and flexible.

The 'fdt' object stores information to be used by methods summary, print, plot, mean, median and mfv. The result of plot is a histogram. The methods summary, print and plot provide a reasonable set of parameters to format and plot the 'fdt' object in a pretty (and publishable) way.

Value

For fdt the method fdt.default returns a list of class fdt.default with the slots:

'table'	A data.frame storing the 'fdt';
'breaks'	A vector of length 4 storing 'start', 'end', 'h' and 'right' of the 'fdt' generated by this method;
'data'	A vector of the data 'x' provided.

The methods fdt.data.frame and fdt.matrix return a list of class fdt.multiple. This list has one slot for each numeric (fdt) variable of the 'x' provided. Each slot, corresponding to each numeric variable, stores the same slots of the fdt.default described above.

Author(s)

José Cláudio Faria
Enio G. Jelihovschi
Ivan B. Allaman

See Also

hist provided by **graphics**; table, cut both provided by **base** and hist.data.frame provided by **Hmisc** package.

Examples

```
library(fdth)

##========
## Vector
##========
x <- rnorm(n=1e3,
           mean=5,
           sd=1)

# x
(fdt <- fdt(x))

# x, alternative breaks
(fdt <- fdt(x,
            breaks='Scott'))

# x, k
(fdt <- fdt(x,
            k=10))
```

```
# x, star, end
range(x)

(fdt <- fdt(x,
            start=floor(min(x)),
            end=floor(max(x) + 1)))

# x, start, end, h
(fdt <- fdt(x,
            start=floor(min(x)),
            end=floor(max(x) + 1),
            h=1))

# Effect of right
x <- rep(1:3, 3); sort(x)

(fdt <- fdt(x,
            start=1,
            end=4,
            h=1))

(fdt <- fdt(x,
            start=0,
            end=3,
            h=1,
            right=TRUE))

##================================================
## Data.frame: multivariated with two categorical
##================================================
mdf <- data.frame(c1=sample(LETTERS[1:3], 1e2, TRUE),
                  c2=as.factor(sample(1:10, 1e2, TRUE)),
                  n1=c(NA, NA, rnorm(96, 10, 1), NA, NA),
                  n2=rnorm(100, 60, 4),
                  n3=rnorm(100, 50, 4))

head(mdf)

(fdt <- fdt(mdf))

# By factor!
(fdt <- fdt(mdf,
            k=5,
            by='c1'))

# choose FD criteria
(fdt <- fdt(mdf,
            breaks='FD',
            by='c1'))

(fdt <- fdt(mdf,
            k=5,
            by='c2'))
```

```
(fdt <- fdt(iris,
            k=10))

(fdt <- fdt(iris,
            k=5,
            by='Species'))

#=========================
# Matrices: multivariated
#=========================
(fdt <-fdt(state.x77))
```

`fdt_cat` *Frequency distribution table for categorical data*

Description

A S3 set of methods to easily perform categorical frequency distribution table ('`fdt_cat`') from `vector`, `data.frame` and `matrix` objects.

Usage

```
## S3 generic
fdt_cat(x, ...)

## S3 methods
## Default S3 method:
fdt_cat(x,
        sort=TRUE,
        decreasing=TRUE, ...)

## S3 method for class 'data.frame'
fdt_cat(x,
        by,
        sort=TRUE,
        decreasing=TRUE, ...)

## S3 method for class 'matrix'
fdt_cat(x,
        sort=TRUE,
        decreasing=TRUE, ...)
```

Arguments

`x`	A `vector`, `data.frame` or `matrix` object. If '`x`' is `data.frame` or `matrix` it must contain at least one character/factor column.

by	Categorical variable used for grouping each categorical response, useful only on data.frame.
sort	Logical. Should the fdt_cat be sorted by the absolute frequency into ascending or descending order? (default = TRUE).
decreasing	Logical. Should the sort order be increasing or decreasing? (default = TRUE).
...	Optional further arguments (required by generic).

Details

The simplest way to run 'fdt_cat' is supplying only the 'x' object, for example: ct <- fdt_cat(x). In this case all necessary default values ('sort = TRUE' and 'decreasing = TRUE') will be used.

These options make the 'fdt_cat' very easy and flexible.

The 'fdt_cat' object stores information to be used by methods summary, print, plot and mfv. The result of plot is a bar plot. The methods summary.fdt_cat, print.fdt_cat and plot.fdt_cat provide a reasonable set of parameters to format and plot the 'fdt_cat' object in a pretty (and publishable) way.

Value

For fdt_cat the method fdt_cat.default returns a data.frame storing the 'fdt'.

The methods fdt_cat.data.frame and fdt_cat.matrix return a list of class fdt_cat..multiple. This list has one slot for each categorical variable of the supplied 'x'. Each slot, corresponding to each categorical variable, stores the same slots of the fdt_cat.default described above.

Author(s)

José Cláudio Faria
Enio G. Jelihovschi
Ivan B. Allaman

See Also

hist provided by **graphics**; table, cut both provided by **base** and hist.data.frame provided by **Hmisc** package.

Examples

```
library(fdth)

## Categorical
x <- sample(x=letters[1:5],
            size=5e2,
            rep=TRUE)

(fdt.c <- fdt_cat(x))

(fdt.c <- fdt_cat(x,
                  sort=FALSE))
```

```
##================================================
## Data.frame: multivariated with two categorical
##================================================
mdf <- data.frame(c1=sample(LETTERS[1:3], 1e2, rep=TRUE),
                  c2=as.factor(sample(1:10, 1e2, rep=TRUE)),
                  n1=c(NA, NA, rnorm(96, 10, 1), NA, NA),
                  n2=rnorm(100, 60, 4),
                  n3=rnorm(100, 50, 4))

head(mdf)

(fdt.c <- fdt_cat(mdf))

(fdt.c <- fdt_cat(mdf,
                  dec=FALSE))

(fdt.c <- fdt_cat(mdf,
                  sort=FALSE))

(fdt.c <- fdt_cat(mdf,
                  by='c1'))

##================================================
## Matrix: two categorical
##================================================
x <- matrix(sample(x=letters[1:10],
                   size=100,
                   rep=TRUE),
            nc=2,
            dimnames=list(NULL,
                          c('c1', 'c2')))

head(x)

(fdt.c <- fdt_cat(x))
```

`latex.fdt` *LaTeX table of the frequency distribution table*

Description

This function returns a LaTeX table of the `fdt` objects.

Usage

```
latex.fdt(x,
          columns=1:6,
          round=2,
          format.classes=TRUE,
          pattern='%.2f',
```

```
            replace.breaks=TRUE,
            where='!tbp',
            caption=NULL,
            label=NULL,
            size='',
            algtable=c('\\flushleft', '\\centering', '\\flushright'),
            hline1='\\hline',
            header=NULL,
            hline2='\\hline',
            algclim='l',
            algfreq='r',
            hline3='\\hline')

latex.fdt_cat(x,
              columns=1:6,
              where='!tbp',
              caption=NULL,
              label=NULL,
              size='',
              algtable=c('\\flushleft', '\\centering', '\\flushright'),
              hline1='\\hline',
              header=NULL,
              hline2='\\hline',
              algclim='l',
              algfreq='r',
              hline3='\\hline')

latex.fdt_cat.multiple(x,
                       columns=1:6,
                       where='!tbp',
                       caption=NULL,
                       label=NULL,
                       size='',
                      algtable=c('\\flushleft', '\\centering', '\\flushright'),
                       hline1='\\hline',
                       header=NULL,
                       hline2='\\hline',
                       algclim='l',
                       algfreq='r',
                       hline3='\\hline')
```

Arguments

x	A fdt object.
columns	A vector of integers to select columns of the data.frame table. For example: columns=c(1:2, 4, 6).

round	Rounds the fdt columns to the specified number of decimal places. The default is 2.
format.classes	Logical, if TRUE, the default, the first column of the data.frame table will be formated using regular expression according with 'pattern' argument.
pattern	Same as fmt in sprintf. The default is ''%.2f''.
replace.breaks	Logical, if TRUE, the default, the mathematical symbols for breaks: '[,)' or '(,]', will be replaced by the LaTeX '$\vdash$' or '$\dashv$' symbols.
where	Specifies the location to which the floating body can move. The default is ''!tbp''. Possible values are the tabular environment same, e.g., ''h'', ''b'' and ''p''.
caption	Is a legend of table. The default is NULL. If the table class is fdt_cat.multiple, the caption should be a vector.
label	A text string representing a symbolic label for the table for referencing in the LaTeX '\label' and '\ref' commands. 'label' is useful in a Rnoweb document only if caption is also provided.
size	Specifies the font size of the table. The default is empty. The possible values are the same size used for letters in latex, e.g., ''\\scriptsize'', ''\\large'' and ''\\LARGE''.
algtable	Specifies the alignment of the table on page. The default is ''\\flushleft''. Possible values are: ''\\flushleft'', ''\\centering'' and ''\\flushright''.
hline1	The line type of the table top. The default is ''\\hline''.
header	An alternative vector of strings for table header.
hline2	The line type of the lower table header. The default is ''\\hline''.
algclim	Specifies the alignment of the Class Limits. The default is ''l''. Possible others values are ''c'' and ''r''.
algfreq	Specifies the alignment of the frequency columns. The default is ''r''. Possible others values are ''c'' and ''l''.
hline3	The line type of the end table. The default is ''\\hline''.

Details

The function latex.fdt was developed to make the life easier for those who whish to make latex tables with the results of the fdt function.

Some people could ask: why do not use the function latex of the package **Hmisc** or xtable of the **xtable**? Both latex and xtable functions are complex. Many parameters are required to build an adequate fdt table. It is not always intuitive to many users, discouraging them to use the latex or xtable functions to build fdt tables.

The function latex.fdt is extremely easy to use. Obviously, the function provides a default formatting according to what the authors think is the ideal for presentation in articles, reports, and others. If the user is not satisfied with the formatting provided by this function, the functions latex and xtable provides arguments that allow formatting the tables according to the user need.

It is possible to select what columns of the table (a data.frame) will be shown, as well as the pattern of the first column. The columns are:

1. 'Class limits'
2. 'f' - Absolute frequency
3. 'rf' - Relative frequency
4. 'rf(%)' - Relative frequency, %
5. 'cf' - Cumulative frequency
6. 'cf(%)' - Cumulative frequency, %

The available parameters offer an easy and powerful way to format the 'fdt' for publications and other purposes.

Value

An object of the class latex.fdt and latex.fdt_cat.

Author(s)

José Cláudio Faria
Enio G. Jelihovschi
Ivan B. Allaman

See Also

fdt, latex, xtable

Examples

```
library(fdth)

# +++++ Quantitative data

##Example 1: The simplest possible
t1 <- fdt(rnorm(n=1e3,
                mean=10,
                sd=2))

t1x <- latex.fdt(t1)

t1x


## Example 2
(t1x <- latex.fdt(t1,
                  replace.breaks=FALSE,
                  columns=c(1:2, 4, 6)))


## Example 3
t2 <- fdt(rnorm(n=1e3,
                mean=10,
```

```
                sd=2),
          right=TRUE)

t2x <- latex.fdt(t2,
                 algtable='\\centering',
                 caption='Frequency distribution table 2',
                 label='tbl-2',
                 pattern='%.1f')

t2x


## Example 4
t3 <- fdt(rnorm(n=1e3,
                mean=10,
                sd=2))

t3x <- latex.fdt(t3,
                 algtable='\\flushright',
                 caption='Frequency distribution table 3',
                 label='tbl-3',
                 pattern='%.1e')

t3x

# +++++ Qualitative data

## Example 5
t4 <- fdt_cat(sample(LETTERS[1:3],
                    replace=TRUE,
                    size=30))

t4x <- latex.fdt_cat(t4,
                     caption='Frequency distribution table 4',
                     label='tbl-4')
t4x

t5 <- fdt_cat(data.frame(c1=sample(LETTERS[1:3],
                                   replace=TRUE,
                                   size=10),
                         c2=sample(letters[4:5],
                                   replace=TRUE,
                                   size=10)))

caption <- c('Frequency distribution table 5',
             'Frequency distribution table 6')

t5x <- latex.fdt_cat.multiple(t5,
                              caption=caption,
                              algtable='\\flushleft')
t5x
```

`make.fdt` *Frequency distribution table for continuous and categorical variables*

Description

Makes a full fdt from a minimal set of information.
Useful to reproduce (when the real data vector is not known) a previous fdt.

Usage

```
make.fdt(f,
         start,
         end,
         right=FALSE)

make.fdt_cat(f,
             categories=NULL,
             sort=TRUE,
             decreasing=TRUE)
```

Arguments

`f`	A numeric `vector` object of frequency.
`start`	The left value of the interval of the first class.
`end`	The last value of the interval of the last class.
`right`	Intervals right open (default = `FALSE`).
`categories`	...
`sort`	...
`decreasing`	...

Details

Given the starting and ending values of the continuous variable table or the levels of the categorical variable plus the number of intervals and the absolute frequency values the functions `make.fdt` and `make.fdt_cat` reconstruct whole fdt or fdt_cat table.

Value

The function `make.fdt` returns a list with the slots:

`table`	A `data.frame` storing the '`fdt`'.
`breaks`	A `vector` of length 4 storing '`start`', '`end`', '`h`' and '`right`' of the '`fdt`' generated by this method.

The function `make.fdt_cat` returns a list whith the slots:

`Category`	The levels of the categorical variable.
`f`	Absolute frequency, `numeric`
`rf`	Relative frequency, `numeric`
`rf(%)`	Relative frequency in percentages, `numeric`
`cf`	Cumulative frequency; `numeric`
`cf(%)`	Cumulative frequency in percentages, `numeric`

Author(s)

José Cláudio Faria
Enio G. Jelihovschi
Ivan B. Allaman

See Also

`table` and `cut` provided by **base** package.

Examples

```
## Numeric
## Making one reference fdt
set.seed(33)
x <- rnorm(1e3,
           20,
           2)

(tb.r <- fdt(x))

## Making a brand new
(tb.n  <- make.fdt(f=tb.r$table$f,
                   start=13.711,
                   end=27.229))   # Huumm ..., good, but ... Can it be better?

summary(tb.n,
        format=TRUE,
        pattern='%.3f')           # Is it nice now?


## Categorical
x <- sample(letters[1:5],
            1e3,
            rep=TRUE)

## Making one reference fdt
(tb.r <- fdt_cat(x))

## Making a brand new
(tb.n <- make.fdt_cat(f=tb.r$f,
                      categ=tb.r$Category))
```

`mean.fdt` *Mean of frequency distribution table (numerical variable)*

Description

S3 method for the arithmetic mean of a `fdt`.
Useful to estimate the arithmetic mean (when the real data vector is not known) from a previous `fdt`.

Usage

```
## S3 method: numerical
## S3 method for class 'fdt'
mean(x, ...)
```

Arguments

`x`	A `fdt` (simple or multiple) object.
`...`	Required by generic.

Details

`mean.fdt` calculates the mean value based on a known formula using the midpoint of each interval class. `mean.fdt.multiple` calls `mean.fdt` for each variable, that is, each column of the data.frame.

Value

`mean.fdt` returns a numeric vector containing the mean value of the `fdt`. `mean.fdt.multiple` returns a list, where each element is a numeric vector containing the mean value of the `fdt` for each variable.

Author(s)

José Cláudio Faria
Enio G. Jelihovschi
Ivan B. Allaman

See Also

`median.fdt`, `mfv`.

Examples

```
mdf <- data.frame(x=rnorm(1e3,
                          20,
                          2),
                  y=rnorm(1e3,
                          30,
```

```
                    3),
                z=rnorm(1e3,
                    40,
                    4))

head(mdf)

apply(mdf,
      2,
      mean)

mean(fdt(mdf))
```

`median.fdt` *Median of frequency distribution table (numerical variable)*

Description

S3 method for the median of a `fdt`.
Useful to estimate the median (when the real data vector is not known) from a previous `fdt`.

Usage

```
## S3 method: numerical
## S3 method for class 'fdt'
median(x, ...)
```

Arguments

`x`	A `fdt` (simple or multiple) object.
`...`	Required by generic.

Details

`median.fdt` calculates the value of the median based on a known formula. `median.fdt.multiple` calls `mean.fdt`for each variable, that is, each column of the data.frame.

Value

`mean.fdt` returns a numeric vector containing the value of the median of the `fdt`. `median.fdt.multiple` returns a list, where each element is a numeric vector containing the value of the median of the `fdt` for each variable.

Author(s)

José Cláudio Faria
Enio G. Jelihovschi
Ivan B. Allaman

See Also

mean.fdt, mfv.

Examples

```
mdf <- data.frame(x=rnorm(1e3,
                          20,
                          2),
                  y=rnorm(1e3,
                          30,
                          3),
                  z=rnorm(1e3,
                          40,
                          4))

head(mdf)

apply(mdf,
      2,
      median)

median(fdt(mdf))
```

---

mfv — *Most frequent value (statistical mode) of frequency distribution table (numerical and categorical variable)*

Description

S3 methods for the most frequent value (statistical mode) of a fdt.
Useful to estimate the most frequent value or statistical mode. May also be used, by using a previous fdt, when the original data vector is not known.

Usage

```
## S3 generic
mfv(x, ...)

## S3 methods: numerical and categorical
## Default S3 method:
mfv(x, ...)

## S3 method for class 'fdt'
mfv(x, ...)

## S3 method for class 'fdt.multiple'
mfv(x, ...)
```

```
## S3 method for class 'fdt_cat'
mfv(x, ...)

## S3 method for class 'fdt_cat.multiple'
mfv(x, ...)
```

Arguments

x	A fdt or fdt_cat (simple or multiple) object.
...	Required to be generic.

Details

mfv.fdt and mfv.fdt_cat calculates the most frequent value (mfv) based on a known formula. mfv.fdt.multiple and mfv.fdt_cat.multiplecall respectively mfv.fdt or mfv.fdt_catfor each variable, that is, each column of the data.frame.

Value

mfv.fdt returns a numeric vector containing the mfv value of the fdt. mean.fdt.multiple returns a list, where each element is a numeric vector containing the mean value of the fdt for each variable. mfv.fdt_cat returns a character vector containing the mfv value of the fdt_cat. mean.fdt_cat.multiple returns a list, where each element is a character vector containing the mfv value of the fdt_cat for each variable.

Author(s)

José Cláudio Faria
Enio G. Jelihovschi
Ivan B. Allaman

See Also

mean.fdt, median.fdt.

Examples

```
## Numerical
mdf <- data.frame(x=rnorm(1e2,
                          20,
                          2),
                  y=rnorm(1e2,
                          30,
                          3),
                  z=rnorm(1e2,
                          40,
                          4))

head(mdf)

mfv(mdf$x)   # From vector x
```

```
mfv(mdf$y)   # From vector y
mfv(mdf$z)   # From vector z

(tb <- fdt(mdf))

mfv(tb)      # From agruped dad in a fdt


## Categorical
mdf <- data.frame(c1=sample(letters[1:5],
                            1e3,
                            rep=TRUE),
                  c2=sample(letters[6:10],
                            1e3,
                            rep=TRUE),
                  c3=sample(letters[11:21],
                            1e3,
                            rep=TRUE))
head(mdf)

mfv(mdf$c1)   # From vector c1
mfv(mdf$c2)   # From vector c2
mfv(mdf$c3)   # From vector c3

(tb <- fdt_cat(mdf))

mfv(tb)      # From agruped dad in a fdt
```

`plot.fdt` *Plot fdt.default and fdt.multiple objects*

Description

S3 methods for `fdt.default` and `fdt.multiple` objects. It is possible to plot histograms and polygons (absolute, relative and cumulative).

Usage

```
## S3 methods
## S3 method for class 'fdt.default'
plot(x,
     type=c('fh', 'fp',
            'rfh', 'rfp',
            'rfph', 'rfpp',
            'd',
            'cdh', 'cdp',
            'cfh', 'cfp',
            'cfph', 'cfpp'),
     v=FALSE,
```

```
     v.round=2,
     v.pos=3,
     xlab="Class limits",
     xlas=0,
     ylab=NULL,
     col="gray",
     xlim=NULL,
     ylim=NULL,
     main=NULL,
     x.round=2, ...)

## S3 method for class 'fdt.multiple'
plot(x,
     type=c('fh', 'fp',
            'rfh', 'rfp',
            'rfph', 'rfpp',
            'd',
            'cdh', 'cdp',
            'cfh', 'cfp',
            'cfph', 'cfpp'),
     v=FALSE,
     v.round=2,
     v.pos=3,
     xlab="Class limits",
     xlas=0,
     ylab=NULL,
     col="gray",
     xlim=NULL,
     ylim=NULL,
     main=NULL,
     main.vars=TRUE,
     x.round=2, ...)

## S3 method for class 'fdt_cat.default'
plot(x,
     type=c('fb', 'fp', 'fd',
            'rfb', 'rfp', 'rfd',
            'rfpb', 'rfpp', 'rfpd',
            'cfb', 'cfp', 'cfd',
            'cfpb', 'cfpp', 'cfpd',
            'pa'),
     v=FALSE,
     v.round=2,
     v.pos=3,
     xlab=NULL,
     xlas=0,
     ylab=NULL,
     y2lab=NULL,
```

```
     y2cfp=seq(0, 100, 25),
     col=gray(.4),
     xlim=NULL,
     ylim=NULL,
     main=NULL,
     box=FALSE, ...)

## S3 method for class 'fdt_cat.multiple'
plot(x,
     type=c('fb', 'fp', 'fd',
            'rfb', 'rfp', 'rfd',
            'rfpb', 'rfpp', 'rfpd',
            'cfb', 'cfp', 'cfd',
            'cfpb', 'cfpp', 'cfpd',
            'pa'),
     v=FALSE,
     v.round=2,
     v.pos=3,
     xlab=NULL,
     xlas=0,
     ylab=NULL,
     y2lab=NULL,
     y2cfp=seq(0, 100, 25),
     col=gray(.4),
     xlim=NULL,
     ylim=NULL,
     main=NULL,
     main.vars=TRUE,
     box=FALSE, ...)
```

Arguments

x	A 'fdt' object.
type	The type of the plot: 'fb:' Absolute frequency barplot, 'fh:' Absolute frequency histogram, 'fp:' Absolute frequency polygon, 'fd:' Absolute frequency dotchart, 'rfb:' Relative frequency barplot, 'rfh:' Relative frequency histogram, 'rfp:' Relative frequency polygon, 'rfd:' Relative frequency dotchart, 'rfpb:' Relative frequency (%) barplot, 'rfph:' Relative frequency (%) histogram, 'rfpp:' Relative frequency (%) polygon, 'rfpd:' Relative frequency (%) dotchart,

	'd:' Density, 'cdh:' Cumulative density histogram, 'cdp:' Cumulative density polygon, 'cfb:' Cumulative frequency barplot, 'cfh:' Cumulative frequency histogram, 'cfp:' Cumulative frequency polygon, 'cfd:' Cumulative frequency dotchart, 'cdpb:' Cumulative frequency (%) barplot, 'cdph:' Cumulative frequency (%) histogram, 'cfpp:' Cumulative frequency (%) polygon, 'cfpd:' Cumulative frequency (%) dotchart. 'pa:' Pareto chart.
v	Logical flag: should the values be added to the plot?
v.round	If v=TRUE, it rounds the values to the specified number of decimal places (default 0).
v.pos	If v=TRUE, a position specifier for the text. Values of 1, 2, 3 and 4, respectively indicate positions below, to the left of, above and to the right of the coordinates (default 3).
xlab	A label for the 'x' axis.
xlas	An integer which controls the orientation of the 'x' axis labels: '0:' parallel to the axes, '2:' perpendicular to the axes.
ylab	A label for the 'y' axis.
y2lab	A label for the 'y2' axis.
y2cfp	A cumulative percent frequency for the 'y2' axis. The default is seq(0, 100, 25).
col	A vector of colors.
xlim	The 'x' limits of the plot.
ylim	The 'y' limits of the plot.
main	Title of the plot(s). This option has priority over 'main.vars', i.e, if any value is informed, the variable names will not be used as title of the plot(s). For fdt.multiple, the value should be a vector of characters, in this case, the R's recycling rule will be used.
main.vars	Logical flag: should the variables names be added as title of each plot (default TRUE)?
x.round	A numeric value to round the 'x' ticks: '0:' parallel to the axes, '1:' horizontal, '2:' perpendicular to the axes, '3:' vertical.
box	...
...	Optional plotting parameters.

Details

The result is a single histogram or polygon (absolute, relative or cumulative) for `fdt.default` or a set of histograms or polygon (absolute, relative or cumulative) for `fdt.multiple` objects. Both '`default and multiple`' try to compute the maximum number of histograms that will fit on one page, then it draws a matrix of histograms. More than one graphical device may be opened to show all histograms.

The result is a single barplot, polygon, dotchar (absolute, relative or cumulative) and Pareto chart for `fdt_cat.default` or a set of the same graphs for `fdt_cat.multiple` objects. Both '`default and multiple`' try to compute the maximum number of histograms that will fit on one page, then it draws a matrix of graphs lited above. More than one graphical device may be opened to show all graphs.

Author(s)

José Cláudio Faria
Enio G. Jelihovschi
Ivan B. Allaman

See Also

`hist.data.frame` provided by **Hmisc** package.

Examples

```
library(fdth)

#================================
# Vectors: univariated numerical
#================================
x <- rnorm(n=1e3,
           mean=5,
           sd=1)

(d <- fdt(x))

# Histograms
plot(d)  # Absolute frequency histogram

plot(d,
     main='My title')

plot(d,
     x.round=3,
     col='darkgreen')

plot(d,
     xlas=2)

plot(d,
     x.round=3,
     xlas=2,
     xlab=NULL)
```

```
plot(d,
     v=TRUE,
     cex=.8,
     x.round=3,
     xlas=2,
     xlab=NULL,
     col=rainbow(11))

plot(d,
     type='fh')    # Absolute frequency histogram

plot(d,
     type='rfh')   # Relative frequency histogram

plot(d,
     type='rfph')  # Relative frequency (%) histogram

plot(d,
     type='cdh')   # Cumulative density histogram

plot(d,
     type='cfh')   # Cumulative frequency histogram

plot(d,
     type='cfph')  # Cumulative frequency (%) histogram

# Poligons
plot(d,
     type='fp')    # Absolute frequency polygon

plot(d,
     type='rfp')   # Relative frequency polygon

plot(d,
     type='rfpp')  # Relative frequency (%) polygon

plot(d,
     type='cdp')   # Cumulative density polygon

plot(d,
     type='cfp')   # Cumulative frequency polygon

plot(d,
     type='cfpp')  # Cumulative frequency (%) polygon

# Density
plot(d,
     type='d')     # Density

# Theoretical curve and fdt
x <- rnorm(1e5,
           mean=5,
```

```
           sd=1)

plot(fdt(x,
         k=100),
     type='d',
     col=heat.colors(100))

curve(dnorm(x,
            mean=5,
            sd=1),
      col='darkgreen',
      add=TRUE,
      lwd=2)


#==================================
# Vectors: univariated categorical
#==================================
x <- sample(letters[1:5],
            1e3,
            rep=TRUE)

(dc <- fdt_cat(x))

# Barplot: the default
plot(dc)

# Barplot
plot(dc,
     type='fb')

# Polygon
plot(dc,
     type='fp')

# Dotchart
plot(dc,
     type='fd')

# Pareto chart
plot(dc,
     type='pa')

#==========================================
# Data.frames: multivariated with categorical
#==========================================
mdf <- data.frame(X1=rep(LETTERS[1:4], 25),
                  X2=as.factor(rep(1:10, 10)),
                  Y1=c(NA, NA, rnorm(96, 10, 1), NA, NA),
                  Y2=rnorm(100, 60, 4),
                  Y3=rnorm(100, 50, 4),
                  Y4=rnorm(100, 40, 4))
```

```
# Histograms
(d <- fdt(mdf))

plot(d,
     v=TRUE,
     cex=.8)

plot(d,
     col='darkgreen',
     ylim=c(0, 40))

plot(d,
     col=rainbow(8),
     ylim=c(0, 40),
     main=LETTERS[1:4])

plot(d,
     type='fh')

plot(d,
     type='rfh')

plot(d,
     type='rfph')

plot(d,
     type='cdh')

plot(d,
     type='cfh')

plot(d,
     type='cfph')

# Poligons
plot(d,
     v=TRUE,
     type='fp')

plot(d,
     type='rfp')

plot(d,
     type='rfpp')

plot(d,
     type='cdp')

plot(d,
     type='cfp')

plot(d,
     type='cfpp')
```

```
# Density
plot(d,
     type='d')

levels(mdf$X1)

plot(fdt(mdf,
         k=5,
         by='X1'),
     ylim=c(0, 12))

levels(mdf$X2)

plot(fdt(mdf,
         breaks='FD',
         by='X2'))

plot(fdt(mdf,
         k=5,
         by='X2'))  # It is difficult to compare

plot(fdt(mdf,
         k=5,
         by='X2'),
     ylim=c(0, 8))  # Easy

plot(fdt(iris,
         k=5))

plot(fdt(iris,
         k=5),
     col=rainbow(5))

plot(fdt(iris,
         k=5,
         by='Species'),
     v=TRUE)

d <- fdt(iris,
         k=10)

plot(d)

plot(d,
     type='d')

# Categorical data
(dc <- fdt_cat(mdf))
plot(dc)

plot(dc,
     type='fd',
```

```
     pch=19)

#=========================
# Matrices: multivariated
#=========================
plot(fdt(state.x77))

plot(fdt(volcano))
```

`print` *Print method for latex.fdt and latex.fdt_cat objects*

Description

Prints a summary list for `latex.fdt` `latex.fdt_cat` objects.

Usage

```
## S3 method
## S3 method for class 'latex.fdt'
print(x, ...)
```

Arguments

`x`	A given object of the class `latex.fdt` or `latex.fdt_cat`.
`...`	Optional further arguments (require by generic).

Author(s)

José Cláudio Faria
Enio G. Jelihovschi
Ivan B. Allaman

See Also

`latex.fdt`, `latex.fdt_cat`

Examples

```
library(fdth)

##Example 1: The simplest possible
t1 <- fdt(rnorm(n=1e3,
                mean=10,
                sd=2))

t1x <- latex.fdt(t1)

t1x
```

```
## Example 2
(t1x <- latex.fdt(t1,
                  replace.breaks=FALSE,
                  columns=c(1:2, 4, 6)))


## Example 3
t2 <- fdt(rnorm(n=1e3,
                mean=10,
                sd=2),
          right=TRUE)

t2x <- latex.fdt(t2,
                 algtable='\\centering',
                 caption='Frequency distribution table 2',
                 label='tbl-2',
                 pattern='%.1f')

t2x


## Example 4
t3 <- fdt(rnorm(n=1e3,
                mean=10,
                sd=2))

t3x <- latex.fdt(t3,
                 algtable='\\flushright',
                 caption='Frequency distribution table 3',
                 label='tbl-3',
                 pattern='%.1e')

t3x
```

`print.fdt` *Print methods for fdt objects*

Description

S3 methods to return a `data.frame` (the frequency distribution table - fdt) for `fdt.default` and `fdt.multiple` objects; `data.frame` (the frequency distribution table - fdt_cat) for `fdt_cat.default` and `fdt_cat.multiple` objects.

Usage

```
## S3 methods
## S3 method for class 'fdt.default'
print(x,
```

```
      columns=1:6,
      round=2,
      format.classes=FALSE,
      pattern='%09.3e',
      row.names=FALSE,
      right=TRUE, ...)

## S3 method for class 'fdt.multiple'
print(x,
      columns=1:6,
      round=2,
      format.classes=FALSE,
      pattern='%09.3e',
      row.names=FALSE,
      right=TRUE, ...)

## S3 method for class 'fdt_cat.default'
print(x,
      columns=1:6,
      round=2,
      row.names=FALSE,
      right=TRUE, ...)

## S3 method for class 'fdt_cat.multiple'
print(x,
      columns=1:6,
      round=2,
      row.names=FALSE,
      right=TRUE, ...)
```

Arguments

x	A 'fdt' object.
columns	A vector of integers to select columns of the data.frame table.
round	Rounds 'fdt' columns to the specified number of decimal places (default 2).
format.classes	Logical, if TRUE the first column of the data.frame table will be formated using regular expression. The default is "%09.3e".
pattern	Same as fmt in sprintf.
row.names	Logical (or character vector), indicating whether (or what) row names should be printed. The default is FALSE.
right	Logical, indicating whether or not strings should be right-aligned. The default is right-alignment.
...	Potential further arguments (require by generic).

Details

For print.fdt, it is possible to select what columns of the table (a data.frame) will be shown, as well as the pattern of the first column, for print.fdt_cat it is only possible to select what columns

of the table (a `data.frame`) will be shown. The columns are:

1. '`Class limits`'
2. '`f`' - Absolute frequency
3. '`rf`' - Relative frequency
4. '`rf(%)`' - Relative frequency, %
5. '`cf`' - Cumulative frequency
6. '`cf(%)`' - Cumulative frequency, %

The available parameters offer an easy and powerful way to format the '`fdt`' for publications and other purposes.

Value

A single `data.frame` for `fdt.default` and `fdt.default` or multiple `data.frames` for `fdt.multiple` and `fdt_cat.multiple`.

Author(s)

José Cláudio Faria
Enio G. Jelihovschi
Ivan B. Allaman

Examples

```
library (fdth)

#======================
# Vectors: univariated
#======================
set.seed(1)

x <- rnorm(n=1e3,
           mean=5,
           sd=1)

d <- fdt(x)

str(d)

d

print(d) # the same

print(d,
      format=TRUE)      # It can not be what you want to publications!

print(d,
      format=TRUE,
      pattern='%.2f')   # Huumm ..., good, but ... Can it be better?
```

```
print(d,
      col=c(1:2, 4, 6),
      format=TRUE,
      pattern='%.2f')   # Yes, it can!

range(x)                # To know x

print(fdt(x,
          start=1,
          end=9,
          h=1),
      col=c(1:2, 4, 6),
      format=TRUE,
      pattern='%d')     # Is it nice now?

d[['table']]                        # Stores the feq. dist. table (fdt)
d[['breaks']]                       # Stores the breaks of fdt
d[['breaks']]['start']              # Stores the left value of the first class
d[['breaks']]['end']                # Stores the right value of the last class
d[['breaks']]['h']                  # Stores the class interval
as.logical(d[['breaks']]['right'])  # Stores the right option

#============================================
# Data.frames: multivariated with categorical
#============================================
mdf <- data.frame(X1=rep(LETTERS[1:4], 25),
                  X2=as.factor(rep(1:10, 10)),
                  Y1=c(NA, NA, rnorm(96, 10, 1), NA, NA),
                  Y2=rnorm(100, 60, 4),
                  Y3=rnorm(100, 50, 4),
                  Y4=rnorm(100, 40, 4))

(d <- fdt_cat(mdf))

print(d)

(d <- fdt(mdf))

print(d)

str(d)

print(d, # the s
      format=TRUE)

print(d,
      format=TRUE,
      pattern='%05.2f')  # regular expression

print(d,
      col=c(1:2, 4, 6),
      format=TRUE,
      pattern='%05.2f')
```

```
print(d,
      col=c(1:2, 4, 6))

print(d,
      col=c(1:2, 4, 6),
      format=TRUE,
      pattern='%05.2f')

levels(mdf$X1)

print(fdt(mdf,
          k=5,
          by='X1'))

levels(mdf$X2)

print(fdt(mdf,
          breaks='FD',
          by='X2'),
      round=3)

print(fdt(mdf,
          k=5,
          by='X2'),
      format=TRUE,
      round=3)

print(fdt(iris,
          k=5),
      format=TRUE,
      patter='%04.2f')

levels(iris$Species)

print(fdt(iris,
          k=5,
          by='Species'),
      format=TRUE,
      patter='%04.2f')

#=========================
# Matrices: multivariated
#=========================
print(fdt(state.x77),
      col=c(1:2, 4, 6),
      format=TRUE)

print(fdt(volcano,
          right=TRUE),
      col=c(1:2, 4, 6),
      round=3,
      format=TRUE,
```

```
        pattern='%05.1f')
```

`quantile.fdt` *Quantile of frequency distribution table (numerical variable)*

Description

S3 methods for the quantile of a `fdt`.
Useful to estimate the quantile (when the real data vector is not known) from a previous `fdt`.

Usage

```
## S3 methods: numerical
## S3 method for class 'fdt'
quantile(x,
         ...,
         i=1,
         probs=seq(0, 1, 0.25))

## S3 method for class 'fdt.multiple'
quantile(x, ...)
```

Arguments

`x`	A `fdt` (simple or multiple) object.
`i`	A vector of length up to the length of probs
`probs`	vector of probabilities defining the quantiles
`...`	Potencial further arguments (required by generic).

Details

`quantile.fdt` calculates the quantiles based on a known formula for class intervals. `quantile.fdt.multiple` calls `quantile.fdt` for each variable, that is, each column of the data.frame.

Value

`quantile.fdt` returns a numeric vector containing the value(s) of the quantile(s) from `fdt`. `quantile.fdt.multiple` returns a list, where each element is a numeric vector containing the quantile(s) of the `fdt` for each variable.

Author(s)

José Cláudio Faria
Enio G. Jelihovschi
Ivan B. Allaman

See Also

median.fdt, var.fdt.

Examples

```
mdf <- data.frame(x=rnorm(1e2,
                          20,
                          2),
                  y=rnorm(1e2,
                          30,
                          3),
                  z=rnorm(1e2,
                          40,
                          4))

head(mdf)

apply(mdf,
      2,
      quantile)[2,]             # The first quartile

quantile(fdt(mdf))              # Notice that the i default is 1 (the first quartile)

## A small (but didactic) joke
quantile(fdt(mdf),
         i=2,
         probs=seq(0,
                   1,
                   0.25))       # The quartile 2
quantile(fdt(mdf),
         i=5,
         probs=seq(0,
                   1,
                   0.10))       # The decile 5

quantile(fdt(mdf),
         i=50,
         probs=seq(0,
                   1,
                   0.01))       # The percentile 50

quantile(fdt(mdf),
         i=500,
         probs=seq(0,
                   1,
                   0.001))      # The permile 500

median(fdt(mdf))                # The median (all the results are the same) ;)
```

sd *Standard deviation of frequency distribution table (numerical variable)*

Description

S3 methods for the standard deviation of a `fdt`.
Useful to estimate the standard deviation (when the real data vector is not known) from a previous `fdt`.

Usage

```
## S3 generic
sd(x, ...)

## S3 methods: numerical
## Default S3 method:
sd(x, ...)

## S3 method for class 'fdt'
sd(x, ...)

## S3 method for class 'fdt.multiple'
sd(x, ...)
```

Arguments

`x`	A `fdt` (simple or multiple) object.
`...`	Required to be generic.

Details

`sd.fdt` calculates the value of the variance based on a known formula. `sd.fdt.multiple` calls `sd.fdt`for each variable, that is, each column of the data.frame.

Value

`sd.fdt` returns a numeric vector containing the value of the median of the `fdt`. `median.fdt.multiple` returns a list, where each element is a numeric vector containing the value of the variance of the `fdt` for each variable.

Author(s)

José Cláudio Faria
Enio G. Jelihovschi
Ivan B. Allaman

See Also

var.fdt, mean.fdt.

Examples

```
mdf <- data.frame(x=rnorm(1e3,
                          20,
                          2),
                  y=rnorm(1e3,
                          30,
                          3),
                  z=rnorm(1e3,
                          40,
                          4))

head(mdf)

apply(mdf,
      2,
      sd)

sd(fdt(mdf))
```

---

summary.fdt *Summary methods for fdt objects*

Description

S3 methods to return a data.frame (the frequency distribution table - 'fdt') for fdt.default, fdt.multiple, fdt_cat.default and fdt_cat.multiple objects.

Usage

```
## S3 methods
## S3 method for class 'fdt.default'
summary(object,
        columns=1:6,
        round=2,
        format.classes=FALSE,
        pattern="%09.3e",
        row.names=FALSE,
        right=TRUE, ...)

## S3 method for class 'fdt.multiple'
summary(object,
        columns=1:6,
        round=2,
        format.classes=FALSE,
```

```
        pattern="%09.3e",
        row.names=FALSE,
        right=TRUE, ...)

## S3 method for class 'fdt_cat.default'
summary(object,
        columns=1:6,
        round=2,
        row.names=FALSE,
        right=TRUE, ...)

## S3 method for class 'fdt_cat.multiple'
summary(object,
        columns=1:6,
        round=2,
        row.names=FALSE,
        right=TRUE, ...)
```

Arguments

object	A fdt or fdt_cat object.
columns	A vector of integers to select columns of the data.frame table.
round	Rounds 'fdt' columns to the specified number of decimal places (default 2).
format.classes	Logical, if TRUE the first column of the data.frame table will be formated using regular expression. The default is "%09.3e".
pattern	Same as fmt in sprintf.
row.names	Logical (or character vector), indicating whether (or what) row names should be printed. The default is FALSE.
right	Logical, indicating whether or not strings should be right-aligned. The default is right-alignment.
...	Optional further arguments (require by generic).

Details

It is possible to select what columns of the table (a data.frame) will be shown, as well as the pattern of the first column. The columns are:

1. 'Class limits'
2. 'f' - Absolute frequency
3. 'rf' - Relative frequency
4. 'rf(%)' - Relative frequency, %
5. 'cf' - Cumulative frequency
6. 'cf(%)' - Cumulative frequency, %

The available parameters offer an easy and powerful way to format the 'fdt' for publications and other purposes.

Value

A single `data.frame` for `fdt.default` or multiple `data.frames` for `fdt.multiple`.

Author(s)

José Cláudio Faria
Enio G. Jelihovschi
Ivan B. Allaman

Examples

```
library (fdth)

#======================
# Vectors: univariated
#======================
set.seed(1)

x <- rnorm(n=1e3,
           mean=5,
           sd=1)

d <- fdt(x)

str(d)

d

summary(d)  # the same

summary(d,
        format=TRUE)      # It can not be what you want to publications!

summary(d,
        format=TRUE,
        pattern='%.2f')   # Huumm ..., good, but ... Can it be better?

summary(d,
        col=c(1:2, 4, 6),
        format=TRUE,
        pattern='%.2f')   # Yes, it can!

range(x)                  # To know x

summary(fdt(x,
            start=1,
            end=9,
            h=1),
        col=c(1:2, 4, 6),
        format=TRUE,
        pattern='%d')     # Is it nice now?
```

```
d[['table']]                       # Stores the feq. dist. table (fdt)
d[['breaks']]                      # Stores the breaks of fdt
d[['breaks']]['start']             # Stores the left value of the first class
d[['breaks']]['end']               # Stores the right value of the last class
d[['breaks']]['h']                 # Stores the class interval
as.logical(d[['breaks']]['right'])  # Stores the right option

#==========================================
# Data.frames: multivariated with categorical
#==========================================
mdf <- data.frame(X1=rep(LETTERS[1:4], 25),
                  X2=as.factor(rep(1:10, 10)),
                  Y1=c(NA, NA, rnorm(96, 10, 1), NA, NA),
                  Y2=rnorm(100, 60, 4),
                  Y3=rnorm(100, 50, 4),
                  Y4=rnorm(100, 40, 4))

dcat <- fdt_cat(mdf)

summary(dcat)

d <- fdt(mdf)

str(d)

summary(d)  # the same

summary(d,
        format=TRUE)

summary(d,
        format=TRUE,
        pattern='%05.2f')  # regular expression

summary(d,
        col=c(1:2, 4, 6),
        format=TRUE,
        pattern='%05.2f')

print(d,
      col=c(1:2, 4, 6))

print(d,
      col=c(1:2, 4, 6),
      format=TRUE,
      pattern='%05.2f')

levels(mdf$X1)

summary(fdt(mdf,
            k=5,
            by='X1'))
```

```
levels(mdf$X2)

summary(fdt(mdf,
            breaks='FD',
            by='X2'),
        round=3)

summary(fdt(mdf,
            k=5,
            by='X2'),
        format=TRUE,
        round=3)

summary(fdt(iris,
            k=5),
        format=TRUE,
        patter='%04.2f')

levels(iris$Species)

summary(fdt(iris,
            k=5,
            by='Species'),
        format=TRUE,
        patter='%04.2f')

#=========================
# Matrices: multivariated
#=========================
summary(fdt(state.x77),
        col=c(1:2, 4, 6),
        format=TRUE)

summary(fdt(volcano,
            right=TRUE),
        col=c(1:2, 4, 6),
        round=3,
        format=TRUE,
        pattern='%05.1f')
```

`summary.latex.fdt` *Summary method for latex.fdt and latex.fdt_cat objects*

Description

Returns a summary list for `latex.fdt` and `latex.fdt_cat` objects.

Usage

```
## S3 method
```

```
## S3 method for class 'latex.fdt'
summary(object, ...)
```

Arguments

object	A given object of the class latex.fdt or latex.fdt_cat.
...	Potential further arguments (require by generic).

Author(s)

José Cláudio Faria
Enio G. Jelihovschi
Ivan B. Allaman

See Also

fdt,

Examples

```
library(fdth)

##Example 1: The simplest possible
t1 <- fdt(rnorm(n=1e3,
                mean=10,
                sd=2))

t1x <- latex.fdt(t1)

summary(t1x)


## Example 2
(t1x <- latex.fdt(t1,
                  replace.breaks=FALSE,
                  columns=c(1:2, 4, 6)))

## Example 3
t2 <- fdt(rnorm(n=1e3,
                mean=10,
                sd=2),
          right=TRUE)

t2x <- latex.fdt(t2,
                 algtable='\\centering',
                 caption='Frequency distribution table 2',
                 label='tbl-2',
                 pattern='%.1f')

summary(t2x)

## Example 4
```

```
t3 <- fdt(rnorm(n=1e3,
                mean=10,
                sd=2))

t3x <- latex.fdt(t3,
                 algtable='\\flushright',
                 caption='Frequency distribution table 3',
                 label='tbl-3',
                 pattern='%.1e')

summary(t3x)
```

`var` *Variance of frequency distribution table (numerical variable)*

Description

S3 methods for the variance of a `fdt`.
Useful to estimate the variance (when the real data vector is not known) from a previous `fdt`.

Usage

```
## S3 generic
var(x, ...)

## S3 methods: numerical
## Default S3 method:
var(x, ...)

## S3 method for class 'fdt'
var(x, ...)

## S3 method for class 'fdt.multiple'
var(x, ...)
```

Arguments

`x`	A `fdt` (simple or multiple) object.
`...`	Required to be generic.

Details

`var.fdt` calculates the value of the variance based on a known formula. `var.fdt.multiple` calls `var.fdt`for each variable, that is, each column of the data.frame.

Value

`var.fdt` returns a numeric vector containing the value of the median of the `fdt`. `median.fdt.multiple` returns a list, where each element is a numeric vector containing the value of the variance of the `fdt` for each variable.

Author(s)

José Cláudio Faria
Enio G. Jelihovschi
Ivan B. Allaman

See Also

`sd.fdt`, `mean.fdt`.

Examples

```
mdf <- data.frame(x=rnorm(1e2,
                          20,
                          2),
                  y=rnorm(1e2,
                          30,
                          3),
                  z=rnorm(1e2,
                          40,
                          4))

head(mdf)

apply(mdf,
      2,
      var)

var(fdt(mdf))
```

Index