

Package ‘rtv’

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Title Random Time Variables

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Description A package for conveniently representing, manipulating and visualising time data. Here, time is regarded as a random variable, and objects are used to represent realisations of that random variable. This is particularly useful for change points, irregular timeseries and failure events. There’s a strong emphasis on continuous representations of time, with user-specified origins and units.

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Depends s3x (>= 0.2.0)

Suggests mecdf

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calendar	<i>calendar functions</i>
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Description

These should be mostly self-explanatory. Note that all these functions are vectorised and that all enumerations start at 1 (not 0).

Usage

```
is.leap (year)
ndays.year (year)
ndays.month (year, month)
date2dow (year, month, day)
date2doy (year, month, day)
doy2date (year, doy)
```

Arguments

year	The (full) year, e.g. 2000, 2010, 1924.
month	The month, in 1 to 12.
day	Day of the month, in 1 to (28 to 31, depending on the month).
doy	Day of the year, in 1 to (365 or 366, depending on the year).

coerce	<i>coerce rtv objects to other objects</i>
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Description

These functions should be self-explanatory.

Usage

```
## S3 method for class 'rtv'
as.data.frame(x, ...)
## S3 method for class 'rtv'
as.Date(x, ...)
## S3 method for class 'rtv'
as.POSIXlt(x, ...)
## S3 method for class 'rtv'
as.POSIXct(x, ...)
```

Arguments

x	.
...	.

crtv

crtv objects

Description

Functions for creating continuous (real-based) random time variable objects.

Usage

```
crtv(...)
## S3 method for class 'drtv'
crtv(x, origin, unit, ...)
## S3 method for class 'crtv'
crtv(x, origin, unit, ...)
## S3 method for class 'character'
crtv(x, origin, unit, ..., date=TRUE, hour=6, style)
## S3 method for class 'Date'
crtv(x, origin, unit, ..., hour=6)
## S3 method for class 'POSIXlt'
crtv(x, origin, unit, ...)
## S3 method for class 'POSIXct'
crtv(x, origin, unit, ...)
## Default S3 method:
crtv(x, origin, unit, ...)
crtvs (x, ...)
crtvx (x, ...)
crtvc (x, origin = x$origin, unit = x$unit)
## S3 method for class 'crtv'
seq(a, b, n, ...)
crtvcp (x)
```

Arguments

x	.
a	.
b	.
hour	.
origin	.
unit	.
date	.
style	.
n	.
...	.

drtv

*drtv objects***Description**

Functions for creating discrete (calendar-based) random time variable objects.

Usage

```
drtv(...)
## S3 method for class 'drtv'
drtv(x, ...)
## S3 method for class 'crtv'
drtv(x, ...)
## S3 method for class 'character'
drtv(x, ..., date=TRUE, hour=6, style)
## S3 method for class 'Date'
drtv(x, ..., hour=6)
## S3 method for class 'POSIXlt'
drtv(x, ...)
## S3 method for class 'POSIXct'
drtv(x, ...)
## Default S3 method:
drtv(year=2000, month=1, day=1,
      hour=6, minute=0, second=0,
      dow=1, doy=1, ..., validate=TRUE, round=FALSE)
drtvs (x, ...)
drtvx (x, ...)
```

Arguments

```
x .
year .
month .
day .
hour .
minute .
second .
dow .
doy .
validate .
round .
date .
style .
... .
```

formatdtu	<i>format discrete time units</i>
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Description

The functions `formatmonth` and `formatdow` take either an `rtv` object or an integer vector, and produce a character vector. The function `formatdtu`, is designed to support these two functions, however can be used for other units.

Usage

```
formatmonth (x, ...)
formatdow (x, ...)
formatdtu (x, levels, case="title", nchars=3)
```

Arguments

<code>x</code>	For <code>formatmonth</code> and <code>formatdow</code> , either an <code>rtv</code> object or an integer vector. For <code>formatdtu</code> , an integer vector only.
<code>levels</code>	Level names.
<code>case</code>	The case, set to "upper" or "lower" for their respective cases.
<code>nchars</code>	Number of characters, defaults to 3, set to NA for all.
<code>...</code>	.

<code>is.rtv</code>	<i>test an object's class</i>
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Description

These functions are self-explanatory.

Usage

```
is.rtv (x)
is.drtv (x)
is.crtv (x)
```

Arguments

<code>x</code>	.
----------------	---

math

standard math operations

Description

todo

Usage

```
## S3 method for class 'rtv'
sort(x, ...)
## S3 method for class 'rtv'
sample(x, ...)
## S3 method for class 'drtv'
length(x, ...)
## S3 method for class 'crtv'
length(x, ...)
## S3 method for class 'drtv'
order(x, by.unit = getOption("rtv.unit"),
by.cp = FALSE, ...)
## S3 method for class 'crtv'
order(x, by.unit = x$unit, by.cp = FALSE, ...)
## S3 method for class 'drtv'
c(x, ...)
## S3 method for class 'crtv'
c(x, ...)
## S3 method for class 'drtv'
rep(x, times, ...)
## S3 method for class 'crtv'
rep(x, times, ...)
## S3 method for class 'drtv'
x[i]
## S3 method for class 'crtv'
x[i]
## S3 method for class 'crtv'
mean(x, ...)
## S3 method for class 'crtv'
min(x, ...)
## S3 method for class 'crtv'
max(x, ...)
## S3 method for class 'crtv'
round(x, ...)
## S3 method for class 'crtv'
floor(x, ...)
## S3 method for class 'crtv'
ceiling(x, ...)
## S3 method for class 'crtv'
```

```

range(x, ...)
## S3 method for class 'crtv'
a + b
## S3 method for class 'crtv'
a - b
sample (...)
## Default S3 method:
sample(x, ...)

```

Arguments

```

x          .
i          .
by.unit    .
by.cp      .
times      .
a          .
b          .
...        .

```

print.rtv

print and format rtv objects

Description

Functions for printing and formatting rtv objects. Note that the behaviour of both print.rtv and format.rtv depends on rtv options. The function drtvf (x), is a shortcut for format (drtv (x)), and format.drtv and as.character.drtv do the same thing.

Usage

```

## S3 method for class 'rtv'
print(x, ...)
## S3 method for class 'drtv'
format(x, date=getOption("rtv.date"), style, ...)
## S3 method for class 'drtv'
as.character(x, ...)
drtvf (x, ...)

```

Arguments

```

x          An rtv object.
date       Whether to include the date in formatting, ignored if style provided.
style      The format style, as a single character.
...        .

```

rtvo	<i>rtv options</i>
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Description

Functions to set rtv options. The function `rtvo.reset`, resets all rtv options to their defaults.

Usage

```
rtvo.reset ()
rtvo.format (format=FALSE)
rtvo.date (date=TRUE)
```

Arguments

format	.
date	.

timeplot	<i>time plots</i>
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Description

Functions for creating time plots. For `plot.rtv`: If only `x` is provided, then an ecdfplot is produced. If both `x` and `y` are provided, then a lineplot is produced. If `cycle` is missing (the default), then a plot is produced with a formatted time axis. If `cycle` is specified, then the `x` values are replaced by their cycle positions. Further arguments can be included for `plot.default`, such as `main`. For `timeaxis`: Refer to the standard axis function and `drtvf`. Further arguments can be included for `drtvf`.

Usage

```
## S3 method for class 'rtv'
plot(x, y, ..., at, cycle)
timeaxis (side, x, ..., at, n=7)
```

Arguments

<code>x</code>	For <code>plot.rtv</code> , an <code>rtv</code> object (noting that <code>drtv</code> objects are converted to <code>crtv</code> objects using the default origin and unit). For <code>timeaxis</code> , a <code>crtv</code> object.
<code>y</code>	Optionally, a numeric vector.
<code>cycle</code>	Optionally, a <code>crtv</code> unit.
<code>side</code>	The side to place the axis.
<code>at</code>	Positions of the tick marks.
<code>n</code>	The number of points on the axis, ignored if <code>at</code> provided.
<code>...</code>	.

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