Package ‘roperators’

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Title Additional Operators to Help you Write Cleaner R Code

Version 1.2.0

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Description Provides string arithmetic, reassignment operators, logical operators that handle missing values, and extra logical operators such as floating point equality and all or nothing. The intent is to allow R users to write code that is easier to read, write, and maintain while providing a friendlier experience to new R users from other language backgrounds (such as 'Python') who are used to concepts such as `x += 1` and `'foo' + 'bar'`. Includes operators for not in, easy floating point comparisons, `===` equivalent, and SQL-like `like` operations (`LIKE`), etc. We also added in some extra helper functions, such as OS checks, pasting in Oxford comma format, and functions to get the first, last, nth, or most common element of a vector or word in a string.

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Depends R (≥ 3.0.0)
Imports stats, tools
Suggests magrittr, knitr, markdown, rmarkdown, prettydoc
VignetteBuilder knitr
Encoding UTF-8
RoxygenNote 7.1.2

Collate 'complete_cases.R' 'content_checks.R' 'file_checks.R'
    'ip_checks.R' 'type_checks.R' 'operators.R' 'os_checks.R'
    'paste_functions.R' 'shorthand.R' 'utils.R'

NeedsCompilation no

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    Jeff Jones [aut, led]
**Description**

Modifies the stored value of the left-hand-side object by the right-hand-side object. Equivalent of operators such as `+= -= *= /=` in languages like C++ or Python. `%+=%` and `%-=%` can also work with strings.

**Usage**

- `x %+=% y`
- `x %-=% y`
- `x %*=% y`
- `x %/=% y`
- `x %^=% y`
### assign_ops

\[
\begin{align*}
x & \%log=\% y \\
x & \%root=\% y
\end{align*}
\]

**Arguments**

- \(x\): a stored value
- \(y\): value to modify stored value by

**Examples**

\[
\begin{align*}
x & \leftarrow 1 \\
x & \%+=\% 2 \\
x & == 3 \ # \text{TRUE} \\
x & \%-=\% 3 \\
x & == 0 \ # \text{TRUE}
\end{align*}
\]

# Or with data frames...

\[
\text{test} \leftarrow \text{iris}
\]

# Simply modify in-place

\[
\text{test}\$\text{Sepal.Length}[\text{test}\$\text{Species} == \text{\char"{}setosa\char"{}} \& \text{test}\$\text{Petal.Length} < 1.5] \%+=\% 1
\]

# Which is much nicer than typing:

\[
\begin{align*}
\text{test}\$\text{Sepal.Length}[\text{test}\$\text{Species} == \text{\char"{}setosa\char"{}} \& \text{test}\$\text{Petal.Length} < 1.5] & \leftarrow \\
\text{test}\$\text{Sepal.Length}[\text{test}\$\text{Species} == \text{\char"{}setosa\char"{}} \& \text{test}\$\text{Petal.Length} < 1.5] + 1
\end{align*}
\]

# ...which is over the 100 character limit for R documentation!

# %+=% and %-=% also work with strings

\[
\begin{align*}
x & \leftarrow \text{\char"{}ab\char"{}} \\
x & \%+=\% \text{\char"{}c\char"{}} \\
x & \%-=\% \text{\char"{}b\char"{}} \\
x & == \text{\char"{}ac\char"{}} \ # \text{TRUE}
\end{align*}
\]

# %-=% can also take regular expressions

\[
\begin{align*}
x & \leftarrow \text{\char"{}foobar\char"{}} \\
x & \%-=\% \text{\char"{}[f\char"{}b\char"{]}\char"{}}
\end{align*}
\]

**Author(s)**

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chr

Description

Cleaner conversion functions
convert x to arbitrary class

Usage

chr(x, ...)
int(x, ...)
dbl(x, ...)
num(x, ...)
bool(x, ...)
as.class(x, class)

Arguments

x object to be converted
... other args for as. conversion
class character name of the class to convert x to

Note

These are shorthand aliases for common conversions There is nothing magical here, but it can make your code more readable

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Comparisons

Examples

```
chr(42)  # "42" = as.character
int(42.1) # 42L = as.integer
dbl("42L") # 42.0 = as.double
num("42") # 42 = as.numeric
bool(42) # TRUE = as.logical
```

```
foo <- 255
as.class(foo, "roman")
# [1] CCLV
```

<table>
<thead>
<tr>
<th>comparisons</th>
<th>Enhanced comparisons</th>
</tr>
</thead>
</table>

Description

These operators introduce improved NA handling, reliable floating point tests, and intervals. Specifically:
- Equality that handles missing values
- Floating point equality, an important bit of functionality missing in base R (%~=%)
- Strict (value and type) equality, for those familiar with Javascript ===
- Greater/less than or equal to with missing value equality
- Greater/less than or equal to with floating point and missing equality
- Between (ends excluded)
- Between (ends included)

Usage

```
x %==% y
x %===% y
x %>=% y
x %<=% y
x %<% y
x %<% y
x %>=% y
x %>=% y
```

Arguments

```
x a vector
y a vector
```
## Comparisons

**Author(s)**

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**See Also**

Other comparisons: floating_point_comparisons

**Examples**

```r
## Greater/Less than | Equal

c(1, NA, 3, 4) == c(1, NA, 4, 3)
# TRUE  NA  FALSE  FALSE

c(1, NA, 3, 4) %==% c(1, NA, 4, 3)
# TRUE  TRUE  FALSE  FALSE

c(1, NA, 3, 4) %>=% c(1, NA, 4, 3)
# TRUE  TRUE  FALSE  TRUE

c(1, NA, 3, 4) %<=% c(1, NA, 4, 3)
# TRUE  TRUE  TRUE  FALSE

# Strict equality - a la javascript's ===
# Only true if the class and value of x and y are the same

x <- int(2)
y <- 2
x == y # TRUE
x %==% y # FALSE
x %==% int(y) # TRUE

# NOTE parentheses surrounding expression before this operator are necessary
# Without parentheses it would be interpreted as .1 + .1 + (.1 %==% .3)
```

### Between ###

# ends excluded

2 %><% c(1, 3)
# TRUE

3 %><% c(1, 3)
# FALSE

# ends included

2 %><=% c(1, 3)
# TRUE
complete_cases

3 %>% c(1, 3)
# TRUE

---

complete_cases  Statistics/Summaries with (Only) Missing Data Removed

### Description

Univariate and bivariate summaries and statistics with the least missing data removed (such as complete-cases correlations). These are typically default arguments to standard statistics functions.

### Usage

- length_cc(x, ...)
- n_unique_cc(x, ...)
- min_cc(x, ...)
- max_cc(x, ...)
- range_cc(x, ...)
- all_cc(x, ...)
- any_cc(x, ...)
- sum_cc(x, ...)
- prod_cc(x, ...)
- mean_cc(x, ...)
- median_cc(x, ...)
- var_cc(x, y = NULL, ...)
- cov_cc(x, y = NULL, ...)
- cor_cc(x, y = NULL, ...)
- sd_cc(x, ...)
- weighted.mean_cc(x, w, ...)
- quantile_cc(x, ...)
IQR_cc(x, ...)

mad_cc(x, ...)

rowSums_cc(x, ...)

colSums_cc(x, ...)

rowMeans_cc(x, ..., rescale = FALSE)

colMeans_cc(x, ..., rescale = FALSE)

Arguments

x An R object. Currently there are methods for numeric/logical vectors and date, date-time and time interval objects. Complex vectors are allowed for \( \text{trim} = 0 \), only.

... arguments to pass to wrapped functions

y NULL (default) or a vector, matrix or data frame with compatible dimensions to \( x \). The default is equivalent to \( y = x \) (but more efficient).

w a numerical vector of weights the same length as \( x \) giving the weights to use for elements of \( x \).

rescale whether to rescale the matrix/df/vector before calculating summaries

Examples

n_o <- 20
n_m <- round(n_o / 3)
x <- rnorm(n_o)
y <- rnorm(n_o)

x[sample(n_o, n_m)] <- NA
y[sample(n_o, n_m)] <- NA

mean_cc(x)  # mean of complete cases
mean_cc(y)
var_cc(x)   # variance of complete cases
var_cc(y)
cor_cc(x, y) # correlation between available cases

---

**Contents of Vector Checks**

Description

Misc/useful functions to easily determine what is contained in a vector.
Usage

\texttt{is.constant(x)}
\texttt{is.binary(x)}

Arguments

\begin{itemize}
  \item \texttt{x} \hspace{1cm} \text{object to be tested}
\end{itemize}

Value

\text{a logical value}

\begin{longtable}{ll}
\textbf{f.as.numeric} & \textit{Convert factor with numeric labels into numeric vector} \\
\end{longtable}

Description

\text{Convert factor with numeric labels into numeric vector}

Usage

\texttt{f.as.numeric(x)}

Arguments

\begin{itemize}
  \item \texttt{x} \hspace{1cm} \text{a factor with numeric labels}
\end{itemize}

Author(s)

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Ben Wiseman, \texttt{benjamin.wiseman@kornferry.com}

Examples

\begin{verbatim}
x <- factor(c(11, 22, 33, 99))
as.numeric(x)
  # 1 2 3 4  \hspace{1cm} \text{NOT typically the desired output}

f.as.numeric(x)
  # 11 22 33 99  \hspace{1cm} \text{Typically desired output}

  # Or...
as.numeric(as.character(x)) \hspace{1cm} \text{A tad unsightly}
\end{verbatim}
**Description**

Check whether file extension is as specified

**Usage**

```r
is_txt_file(x)

is_csv_file(x)

is_excel_file(x)

is_r_file(x)

is_rdata_file(x)

is_rda_file(x)

is_rds_file(x)

is_spss_file(x)

check_ext_against(x, ext = "txt")
```

**Arguments**

- `x` file(s) to be tested
- `ext` extension to test against

**Value**

a logical value

**Note**

These only check the file extension and not the contents of the file. Checking the contents of a file might come later but would be quite a bit more involved. You can use `readr` or `readxl` (for example) to check the file contents.

**Examples**

```r
# create your own file extension checks
is_word_file <- function(x){
  check_ext_against(x, ext = c("doc", "docx"))
}
```
floating_point_comparisons

is_word_file(c("blah.doc", "blah.docx", "blah.txt"))

floating_point_comparisons

Floating point comparison operators

Description

These are an important set of operators missing from base R. In particular, using == on two non-interger numbers can give unexpected results (see examples.)

See this for details: https://docs.oracle.com/cd/E19957-01/806-3568/ncg_goldberg.html

Usage

x %~% y
x %>~% y
x %<~% y

Arguments

x numeric
y numeric

Author(s)

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See Also

Other comparisons: comparisons

Examples

## Floating point test of equality ####

# Basic Equality - no roperators:
(0.1 + 0.1 + 0.1) == 0.3  # FALSE
# Basic Equality - with roperators:
(0.1 + 0.1 + 0.1) %~=% 0.3 # TRUE

# NOTE: for floating point >= and <=
(0.1 + 0.1 + 0.1) %>=% 0.3 # TRUE
(0.1 + 0.1 + 0.1) %<=% 0.3 # FALSE

# Use >~ and <~ for greater/less than or approx equal
get_1st

Little functions to replace common minor functions. Useful in apply statements

Description

Little functions to replace common minor functions. Useful in apply statements

Get most common thing(s)
Return number of unique things in x

Usage

get_1st(x, type = "v")
get_last(x, type = "v")
get_nth(x, n = 1, type = "v")
get_1st_word(x, type = "v", split = " ")
get_last_word(x, type = "v", split = " ")
get_nth_word(x, n = 1, type = "v", split = " ")
get_most_frequent(x, collapse = NULL)
get_most_frequent_word(
  x,
  ignore.punct = TRUE,
  ignore.case = TRUE,
  split = " ",
  collapse = NULL,
  punct.regex = "\[[:punct:\]]",
  punct.replace = ""
)
n_unique(x, na.rm = FALSE)

Arguments

x vector
type 'v' (default) for vector x[1]; 'l' for list x[[1]]
get_1st

n integer, the nth word to select
split character that separated words. Default = '
'
collapse OPTIONAL character - paste output into single string with collapse
ignore.punct logical - ignore punctuation marks
ignore.case logical - ignore case (if true, will return in lower)
punct.regex character - regex used to remove punctuation (by default [[[:punct:]])
punct.replace character - what to replace punctuation with (default is "")
na.rm whether to ignore NAs when determining uniqueness

Value

a vector of most common element(s). Will be character unless x is numeric and you don’t tell it to collapse into a single string!
a vector of most common element(s). Will be character unless x is numeric and you don’t tell it to collapse into a single string!

Author(s)

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Examples

# list of car names
car_names <- strsplit(row.names(mtcars)[1:5], " ")
sapply(car_names, get_1st)
# [1] "Mazda" "Mazda" "Datsun" "Hornet" "Hornet"
sapply(car_names, get_nth, 2)
# [1] "RX4" "RX4" "710" "4" "Sportabout"

# OR if you just want to pull a simple string apart (e.g. someone's full name):
get_1st_word(rownames(mtcars)[1:5])
# [1] "Mazda" "Mazda" "Datsun" "Hornet" "Hornet"
get_last_word(rownames(mtcars)[1:5])
# [1] "RX4" "Wag" "710" "Drive" "Sportabout"
get_nth_word(rownames(mtcars)[1:5], 2)
# [1] "RX4" "RX4" "710" "4" "Sportabout"

my_stuff <- c(1:10, 10, 5)
# These are straight forward
get_1st(my_stuff)
get_nth(my Stuff, 3)
get_last(my Stuff)
get_most_frequent(my Stuff)
my_chars <- c("a", "b", "b", "a", "g", "o", "l", "d")
get_most_frequent(my_chars)
get_most_frequent(my_chars, collapse = " & ")
generic_string <- "Who's A good boy? Winston's a good boy!"

get_1st_word(generic_string)
get_nth_word(generic_string, 3)
get_last_word(generic_string)
# default ignores case and punctuation
get_most_frequent_word(generic_string)
# can change like so:
get_most_frequent_word(generic_string, ignore.case = FALSE, ignore.punct = FALSE)

---

### logicals

**Logical operators**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>These are some convenience functions, such as a not-in, and xor operator.</td>
</tr>
<tr>
<td>This takes two arguments just like grepl - a string and a pattern. TRUE if grepl(pattern, x, ignore.case=TRUE) would be TRUE.</td>
</tr>
<tr>
<td>This takes two arguments just like grepl - a string and a pattern. TRUE if grepl(pattern, x, ignore.case=FALSE, perl=TRUE) would be TRUE. It’s like %like% from data.table (but slower, preferably use data.table).</td>
</tr>
</tbody>
</table>

**Usage**

|x %ni% y|
|x %xor% y|
|x %aon% y|
|x %rlike% pattern|
|x %perl% pattern|

**Arguments**

- x: a character vector
- y: a vector
- pattern: a single character expression

**Note**

data.table has a %like% operator which you should try to use instead if working with data.table!
logicals

Author(s)
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Examples

##### Not in #####

```
"z" %ni% c("a", "b", "c")
# TRUE
```

##### Exclusive or #####

```
TRUE %xor% TRUE
# FALSE
FALSE %xor% FALSE
# FALSE
FALSE %xor% TRUE
# TRUE
```

##### All-or-nothing #####

```
TRUE %aon% TRUE
# TRUE
FALSE %aon% FALSE
# TRUE
FALSE %aon% TRUE
# FALSE
```

# Apply a regular expression/substitution to x:
```
x <- c("foo", "bar", "dOe", "rei", "mei", "obo")

# where x has an O
x[x %rlike% "O"]
# [1] "foo" "dOe" "obo"

# find x where middle letter is "O"
x[x %rlike% "[a-z]O[a-z]"
# will print [1] "foo" "dOe"
```

# Apply a regular expression/substitution to x:
```
x <- c("foo", "bar", "dOe", "rei", "mei", "obo")
```
# find x where middle letter is upper-case "O"

x[x %perl% "[a-z]0[a-z]"]

# will print [1] "dOe"

### Operating system checks

**Description**

Determine the current operating system as well as provide flags to indicate whether the operating system is a Mac/Windows/Linux.

**Usage**

- `get_os()`
- `is.os_mac()`
- `is.os_win()`
- `is.os_lnx()`
- `is.os_unix()`
- `is.os_x64()`
- `is.R_x64()`
- `is.R_revo()`
- `is.RStudio()`

**Author(s)**

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Steven Nydick, <steven.nydic@kornferry.com>

**Examples**

```r
# determine operating system
get_os()

# do we have a particular operating system
is.os_mac()
is.os_win()
```
is.os_lnx()
is.os_unx()

---

**Description**

The available functions are:
- `paste_()` is the same as `paste()` but uses an underscore to separate
- `cat0()` is analogous to `paste()` but for `cat`
- `catN()` is the same as `cat()` but automatically inserts a new line after the `cat`
- `paste_series()` paste a series of things with a conjunction
- `paste_oxford()` shortcut for `paste_series` as oxford comma

**Usage**

```
paste_(..., collapse = NULL)
cat0(..., file = "", fill = FALSE, labels = NULL, append = FALSE)
catN(..., file = "", fill = FALSE, labels = NULL, append = FALSE)
paste_series(
  ..., 
  sep = c(",", ";"),
  conjunction = c("and", "or", "&"),
  use_oxford_comma = TRUE
)
paste_oxford(...)```

**Arguments**

- `...` one or more R objects, to be converted to character vectors.
- `collapse` an optional character string to separate the results. Not `NA_character_`.
- `file` A connection, or a character string naming the file to print to. If "" (the default), `cat` prints to the standard output connection, the console unless redirected by `sink`. If it is "|cmd", the output is piped to the command given by `cmd`, by opening a pipe connection.
- `fill` a logical or (positive) numeric controlling how the output is broken into successive lines. If FALSE (default), only newlines created explicitly by "\n" are printed. Otherwise, the output is broken into lines with print width equal to the option `width` if `fill` is TRUE, or the value of `fill` if this is numeric. Linefeeds
are only inserted between elements, strings wider than fill are not wrapped. Non-positive fill values are ignored, with a warning.

labels character vector of labels for the lines printed. Ignored if fill is FALSE.

append logical. Only used if the argument file is the name of file (and not a connection or "| cmd"). If TRUE output will be appended to file; otherwise, it will overwrite the contents of file.

sep a character string to separate the terms. Not NA_character_.

conjunction the conjunction to use to collapse the final elements in the series (such as and, or, & or something else)

use_oxford_comma whether to use the oxford comma in the series (standard in American English) or to not use the oxford comma

Author(s)

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Examples

```
paste_series("a")
paste_series("a", "b")
paste_series("a", "b", "c")
# works if putting entries into c function
paste_series(c("a", "b", "c"), "d")
# can use oxford comma or not
paste_series("a", "b", "c",
        use_oxford_comma = TRUE)
paste_series("a", "b", "c",
        use_oxford_comma = FALSE)
# makes no difference if fewer than 3 items
paste_series("a", "b",
        use_oxford_comma = TRUE)
```

read.tsv

---

like read.csv, but for tsv and default header = TRUE

Description

like read.csv, but for tsv and default header = TRUE
like read.csv, but for pipe-delineated and defaults to header = TRUE

Usage

```
read.tsv(file, ...)
read.psv(file, ...)
```
Arguments

file               path of file you want to load
...               other args used by read.table

Description

Perform string concatenation and arithmetic is a similar way to other languages. String division is not present in languages like Python, although arguably it is more useful than string multiplication and can be used with regular expressions.

Usage

x %+% y
x %-% y
x %s*% y
x %s/% y

Arguments

x               a string
y               a string

Author(s)

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Examples

("ab" %+" c") == "abc" # TRUE
("abc" %-% "b") == "ac" # TRUE
("ac" %s*% 2) == "acac" # TRUE
("acac" %s/% "c") == 2 # TRUE

# String division with a regular expression:
'\an apple a day keeps the malignant spirit of Steve Jobs at bay' %s/'Steve Jobs|apple'
Type Checks

Description
Misc/useful type checks to prevent duplicated code

Usage

is.scalar(x)
is.scalar_or_null(x)
is.numeric_or_null(x)
is.character_or_null(x)
is.logical_or_null(x)
is.df_or_null(x)
is.list_or_null(x)
is.atomic_nan(x)
is.irregular_list(x)
is.bad_for_calcs(x, na.rm = FALSE)
any_bad_for_calcs(x, ..., na.rm = FALSE)
all_good_for_calcs(x, ..., na.rm = FALSE)
is.bad_for_indexing(x)
is.good_for_indexing(x)
is.bad_and_equal(x, y)
is.bad_for_calcs(x, na.rm = FALSE)
is.good_for_calcs(x, na.rm = FALSE)
is.null_or_na(x)

Arguments

x object to be tested
If true, NA values aren’t considered bad for calculations

Values to be testes

object to be tested

a logical value

Ben Wiseman, <benjamin.wiseman@kornferry.com>

Assign to vector only where regular expression is matched

This takes two arguments just like gsub - a patterns and a replacement. It will totally overwrite any element where the pattern is matched with the second. If you want to simply apply a regex (i.e. replace only the specific bit that matches), use %regex=% instead. If you want to replace with nothing (""), just just %- or %-= instead.

x %regex<-% value

x <- c("a1b", "b1", "c", "d0")

# overwrite any element containing a number
x %regex<-% c("\d+", "x")

print(x)

# "x" "b" "c" "x"
%regex=%  Modify existing object by regular expression

Description

This takes two arguments just like gsub - a patterns and a replacement. It will only overwrite the parts of any character where the pattern is matched with the second argument. If you want to overwrite whole elements via a regex (i.e. replace the entire element if it matches), use %regex<-% instead.

Usage

x %regex=% value

Arguments

x  a character vector
value  c(pattern, replacement)

Author(s)

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Examples

# Apply a regular expression/substitution to x:
x <- c("a1b", "b1", "c", "d0")
# change any number to "x"
x %regex= c("\d+", "x")
print(x)
# "axb" "b" "c" "dx"

%na<-%  Assign value to a vector's missing values

Description

%na<-% is a simple shortcut to assign a specific value to all NA elements contained in x.

Usage

x %na<-% value
Arguments

- `x` a vector
- `value` value to replace vector’s missing values with

Author(s)

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Examples

```r
x <- c("a", NA, "c")
x %na<-% "b"
print(x)
# "a" "b" "c"

x <- c(1, NA, 3, NA)
x %na<-% c(2,4)
print(x)
# 1 2 3 4
```
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