Package 'fpCompare'

May 26, 2026

Type Package

Title Reliable Comparison of Floating Point Numbers

Version 0.2.6

Description Comparisons of floating point numbers are problematic due to errors associated with the binary representation of decimal numbers. Despite being aware of these problems, people still use numerical methods that fail to account for these and other rounding errors (this pitfall is the first to be highlighted in Circle 1 of Burns (2012) 'The R Inferno' <https://www.burns-stat.com/pages/Tutor/R_inferno.pdf>). This package provides new relational operators useful for performing floating point number comparisons with a set tolerance.

URL https://fpcompare.predictiveecology.org, https://github.com/PredictiveEcology/fpCompare

BugReports https://github.com/PredictiveEcology/fpCompare/issues

License GPL-3

Depends R (>= 4.1)

Suggests knitr, rmarkdown, testthat (>= 3.0.0), withr

Encoding UTF-8

Language en-CA

VignetteBuilder knitr

ByteCompile yes

Config/Needs/coverage covr

Config/Needs/website pkgdown

Config/testthat/edition 3

Config/roxygen2/version 8.0.0

NeedsCompilation no

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Repository CRAN

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`%>=%` *Relational operators with tolerance*

Description

Binary operators which allow the comparison of values in numeric vectors.

Usage

```
x %>=% y

x %>>% y

x %<=% y

x %<<% y

x %==% y

x %!=% y
```

Arguments

x	Any numeric object.
y	Any numeric object.

Details

These are similar to their counterparts in `base`, except a tolerance `fpCompare.tolerance` can be specified via `options` to account for floating point rounding errors:

fpCompare	base
%>=%	>=
%>>%	>
%<=%	<=
%<<%	<

%==%	==
%!=%	!=

Inspired by R FAQ 7.31 (https://cran.r-project.org/doc/FAQ/R-FAQ.html#Why-doesn_0027t-R-think-these-num
003f) and this post (https://stackoverflow.com/a/2769618/1380598).

Value

A logical vector indicating the result of the element-by-element comparison. The elements of shorter vectors are recycled as necessary.

Author(s)

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See Also

all.equal(), .Machine()

Examples

```
x1 <- 0.5 - 0.3
x2 <- 0.3 - 0.1
x1 == x2 ## FALSE on most machines
x1 %==% x2 ## TRUE everywhere
identical(all.equal(x1, x2), TRUE) ## TRUE everywhere

set.seed(123)
a <- 1:6
b <- jitter(1:6, 1e-7)
print(rbind(a, b), digits = 16)

b %<=% a
b %<<% a
b %>=% a
b %>>% a
b %==% a
b %!=% a
```

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