# Package ‘fpCompare’

October 13, 2022

**Type** Package

**Title** Reliable Comparison of Floating Point Numbers

**URL** https://github.com/PredictiveEcology/fpCompare

**Version** 0.2.4

**Date** 2022-08-13

**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.

**Depends** R (>= 3.4)

**Suggests** covr, knitr, rmarkdown, testthat

**Encoding** UTF-8

**Language** en-CA

**License** GPL-3

**VignetteBuilder** knitr

**ByteCompile** yes

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

**RoxygenNote** 7.2.1

**NeedsCompilation** no

**Author** Alex M Chubaty [aut, cre] (<https://orcid.org/0000-0001-7146-8135>),
Her Majesty the Queen in Right of Canada, as represented by the
Minister of Natural Resources Canada [cph]

**Maintainer** Alex M Chubaty <achubaty@for-cast.ca>

**Repository** CRAN

**Date/Publication** 2022-08-15 07:30:11 UTC

## R topics documented:

`%>=%` *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)

Alex Chubaty

## 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
```

# Index