

# Package ‘ffbase’

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**License** GPL-3

**Title** Basic Statistical Functions for Package 'ff'

**Type** Package

**LazyLoad** yes

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**Description** Extends the out of memory vectors of 'ff' with statistical functions and other utilities to ease their usage.

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**Depends** R (>= 2.12.0),ff(>= 2.2-11)

**Imports** fastmatch, bit

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## R topics documented:

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ffbase-package *Basic statistical functions for ff*

**Description**

Basic statistical functions for `ff` vectors and `ffdf` data.frames. The aim of `ffbase` is to make working with `ff` vectors and `ffdf` data.frame a bit easier.

**Basic operations**

|  |   |
|--|---|
| <code>cut.ff</code>  | cut a <code>ff</code> vector.   |
| <code>c.ff</code>  | concatenate <code>ff</code> vectors.  |
| <code>unique</code>  | <code>unique</code> for a <code>ff</code> vector and <code>ffdf</code> .        |
| <code>duplicated</code>  | <code>duplicated</code> for a <code>ff</code> vector and <code>ffdf</code> .    |
| <code>ffmatch</code>   | <code>match</code> for a 2 <code>ff</code> vectors.                             |
| <code>ffdfmatch</code>   | <code>match</code> for 2 <code>ffdf</code> objects.                             |
| <code>%in%</code>  | <code>%in%</code> operator for a <code>ff</code> vector and <code>ffdf</code> . |
| <code>is.na.ff</code>  | <code>is.na</code> for a <code>ff</code> vector.                                |
| <code>+, -, *, /, ^, %, %/%</code>                                 | operators for arithmetic on <code>ff</code> vector.                             |
| <code>==, !=, &lt;, &lt;=, &gt;=, &gt;, &amp;,  , !</code>         | compare & logic operators for working with <code>ff</code> vectors.             |
| <code>abs, sign, sqrt, ceiling, floor, trunc, round, signif</code> | Math operators for working on <code>ff</code> vectors.                          |
| <code>log, log10, log2, log1p, exp, expm1</code>                   | Math operators for working on <code>ff</code> vectors.                          |
| <code>acos, acosh, asin, asinh, atan, atanh</code>                 | Math operators for working on <code>ff</code> vectors.                          |
| <code>cos, cosh, sin, sinh, tan, tanh</code>                       | Math operators for working on <code>ff</code> vectors.                          |
| <code>gamma, lgamma, digamma, trigamma</code>                      | Math operators for working on <code>ff</code> vectors.                          |

**Selections**

`subset.ffdf` subset a `ffdf`.

|                             |   |
|-----------------------------|---|
| <code>transform.ffdf</code> | create a new ffdf based on an existing ffdf                   |
| <code>with.ffdf</code>      | create a ff vector based on columns of an existing ffdf       |
| <code>within.ffdf</code>    | create a ffdf data.frame based on columns of an existing ffdf |
| <code>ffwhich</code>        | create a ff integer vector based on a logical expression      |

## Aggregations

|                          |   |
|--------------------------|---|
| <code>hist.ff</code>     | Calculate a histogram for ff vector.            |
| <code>quantile.ff</code> | Get quantiles for ff vector.                    |
| <code>sum.ff</code>      | sum for a ff vector.                            |
| <code>mean.ff</code>     | (trimmed) mean for a ff vector.                 |
| <code>all.ff</code>      | all for logical ff vector.                      |
| <code>min.ff</code>      | min for ff vector.                              |
| <code>max.ff</code>      | max for ff vector.                              |
| <code>cumsum.ff</code>   | cumsum for ff vector.                           |
| <code>cumprod.ff</code>  | cumprod for ff vector.                          |
| <code>range.ff</code>    | range for ff vector.                            |
| <code>table</code>       | table for ff vectors.                           |
| <code>tabulate.ff</code> | tabulate for ff vectors.                        |
| <code>ffdfply</code>     | Split, group and aggregate for ffdf operations. |

## Miscellaneous

|                          |  |
|--------------------------|--|
| <code>ffordered</code>   | Add a sorted index to a ff vector.                         |
| <code>save.ffdf</code>   | Save a ffdf in a directory with its containing ff columns. |
| <code>load.ffdf</code>   | Loads a ffdf from a directory                              |
| <code>pack.ffdf</code>   | Packs ffdf data.frames into a zip or tar file              |
| <code>unpack.ffdf</code> | Unpacks data.frames from a zip or tar file                 |
| <code>ffappend</code>    | Append data to a ff vector.                                |
| <code>ffdfappend</code>  | Append data to a ffdf.                                     |
| <code>merge.ffdf</code>  | Merge two ffdf objects.                                    |
| <code>ffmatch</code>     | match two ff vectors                                       |
| <code>ffdfmatch</code>   | match two ffdf data.frames                                 |
| <code>laf_to_ffdf</code> | Import csv and fixed width files through package LaF.      |

## Examples

```

ffdat <- as.ffdf(data.frame(x=1:10, y=10:1))

# add a new ff vector z to the ffdf data.frame
within(ffdat, {z <- x+y})[]

# add a new ff vector z to the ffdf data.frame using transform
transform(ffdat, z=x+y)[]

cut(ffdat$x, breaks=3)[]

tabulate.ff(ffdat$x)

```

+.ff\_vector

*Arithmetic Operators for ff vectors***Description**

These binary operators perform arithmetic on numeric ff vectors. Arith family:

- Arith: "+", "-", "\*", "/", "^", "%%", "%/%"

The operators require either x or y to be an ff\_vector or both. In case either x or y is not an ff\_vector, the other object needs to be of length 1. Recycling is not implemented.

**Usage**

```

## S3 method for class 'ff_vector'
x + y

## S3 method for class 'ff_vector'
x - y

## S3 method for class 'ff_vector'
x * y

## S3 method for class 'ff_vector'
x / y

## S3 method for class 'ff_vector'
x ^ y

## S3 method for class 'ff_vector'
x %% y

## S3 method for class 'ff_vector'
x %/% y

```

**Arguments**

|   |  |
|---|--|
| x | either a numeric ff_vector or a vector of length 1 in RAM in which case y should be an ff_vector |
| y | either a numeric ff_vector or a vector of length 1 in RAM in which case x should be an ff_vector |

**Value**

an ff\_vector. For the definition of the operators see the base package of R.

---

>.ff\_vector                      *Ops for ff vectors*

---

**Description**

These operators implement ff\_vector specific operators and handle the following operators from the Ops family:

- Compare: "==" , "!=" , "<" , "<=" , ">=" , ">"
- Logic: "&" , "|" , "!"

The operators require either x or y to be an ff\_vector or both. In case either x or y is not an ff\_vector, the other object needs to be of length 1. Recycling is not implemented.

**Usage**

```
## S3 method for class 'ff_vector'
x > y

## S3 method for class 'ff_vector'
x < y

## S3 method for class 'ff_vector'
x == y

## S3 method for class 'ff_vector'
x != y

## S3 method for class 'ff_vector'
x <= y

## S3 method for class 'ff_vector'
x >= y

## S3 method for class 'ff_vector'
x & y
```

```
## S3 method for class 'ff_vector'
x | y

## S3 method for class 'ff_vector'
!x
```

### Arguments

x either a numeric ff\_vector or a vector of length 1 in RAM in which case y should be an ff\_vector

y either a numeric ff\_vector or a vector of length 1 in RAM in which case x should be an ff\_vector

### Value

an ff\_vector. For the definition of the operators see the base package of R.

---

|               |                            |
|---------------|----------------------------|
| abs.ff_vector | <i>Math for ff vectors</i> |
|---------------|----------------------------|

---

### Description

These mathematical functions implement ff\_vector specific math and handle the following functions from the Math family:

- Math: "abs", "sign", "sqrt", "ceiling", "floor", "trunc", "log", "log10", "log2", "log1p", "acos", "acosh"
- Math2: "round", "signif"

The operators require x to be an ff\_vector.

### Usage

```
## S3 method for class 'ff_vector'
abs(x)

## S3 method for class 'ff_vector'
sign(x)

## S3 method for class 'ff_vector'
sqrt(x)

## S3 method for class 'ff_vector'
ceiling(x)

## S3 method for class 'ff_vector'
```

```
floor(x)

## S3 method for class 'ff_vector'
trunc(x, ...)

## S3 method for class 'ff_vector'
log10(x)

## S3 method for class 'ff_vector'
log2(x)

## S3 method for class 'ff_vector'
log1p(x)

## S3 method for class 'ff_vector'
acos(x)

## S3 method for class 'ff_vector'
acosh(x)

## S3 method for class 'ff_vector'
asin(x)

## S3 method for class 'ff_vector'
asinh(x)

## S3 method for class 'ff_vector'
atan(x)

## S3 method for class 'ff_vector'
atanh(x)

## S3 method for class 'ff_vector'
exp(x)

## S3 method for class 'ff_vector'
expm1(x)

## S3 method for class 'ff_vector'
cos(x)

## S3 method for class 'ff_vector'
cosh(x)

## S3 method for class 'ff_vector'
sin(x)

## S3 method for class 'ff_vector'
```



```

sinh(x)

## S3 method for class 'ff_vector'
tan(x)

## S3 method for class 'ff_vector'
tanh(x)

## S3 method for class 'ff_vector'
gamma(x)

## S3 method for class 'ff_vector'
lgamma(x)

## S3 method for class 'ff_vector'
digamma(x)

## S3 method for class 'ff_vector'
trigamma(x)

## S3 method for class 'ff_vector'
log(x, base)

## S3 method for class 'ff_vector'
round(x, digits)

## S3 method for class 'ff_vector'
signif(x, digits)

```

### Arguments

|        |   |
|--------|---|
| x      | a numeric <code>ff_vector</code>                      |
| ...    | for <code>trunc</code> , currently not used           |
| base   | base for <code>log</code>                             |
| digits | digits for <code>round</code> and <code>signif</code> |

### Value

an `ff_vector`. For the definition of the operators see the base package of R.

---

|            |   |
|------------|---|
| addfforder | <i>Add the order of a <code>ff</code> vector of the <code>ff</code> vector <code>x</code></i> |
|------------|---|

---

### Description

Add a `ff` vector that contains the order of the `ff` vector `x` as an attribute. The order can be retrieved using `ffordered`. Note that you have to assign the result to the original vector `x`.

**Usage**

```
addfforder(x, addsorted = FALSE, ...)  
  
ffordered(x)  
  
ffsorted(x)
```

**Arguments**

|           |  |
|-----------|--|
| x         | ff vector to be indexed  |
| addsorted | should the sorted values also be stored in ffsorted?           |
| ...       | parameters that will be passed on to <a href="#">fforder</a> . |

**Value**

The updated vector x

**Examples**

```
x <- ff(rnorm(10))  
  
# adds an index to x (note the assignment)  
x <- addfforder(x)  
  
# retrieve ffindex  
o <- fffordered(x)  
  
o  
# use it to sort the original vector  
x[o]
```

---

all.ff

*Summary methods for ff objects*

---

**Description**

Summary methods for ff objects

**Usage**

```
## S3 method for class 'ff'  
all(x, ..., na.rm = FALSE, range = NULL)
```

**Arguments**

|       |  |
|-------|--|
| x     | a ff object  |
| ...   | optional other (ff) objects  |
| na.rm | should NA be removed?  |
| range | a ri or an integer vector of length==2 giving a range restriction for chunked processing |

**Value**

TRUE, FALSE or NA

---

any.ff *Summary methods for ff objects*

---

**Description**

Summary methods for ff objects

**Usage**

```
## S3 method for class 'ff'
any(x, ..., na.rm = FALSE, range = NULL)
```

**Arguments**

|       |  |
|-------|--|
| x     | a ff object  |
| ...   | optional other (ff) objects  |
| na.rm | should NA be removed?  |
| range | a ri or an integer vector of length==2 giving a range restriction for chunked processing |

**Value**

TRUE, FALSE or NA

---

as.character.ff      *Character Vectors*

---

### Description

The generic function `as.character` converts ff vectors to characters.

### Usage

```
## S3 method for class 'ff'
as.character(x, ...)
```

### Arguments

`x`                    a ff vector  
`...`                  other parameters passed on to chunk

### Value

A factor ff vector of the same length of `x`.

### See Also

[as.character](#)

### Examples

```
as.character(ff(c(NA, 1:100)))
as.character(ff(seq.Date(Sys.Date(), Sys.Date()+100, by = "day")))
as.character(ff(c(Sys.time())))
```

---

as.Date.ff\_vector      *Date Conversion Functions for ff vector*

---

### Description

Date Conversion Functions for ff vector.

### Usage

```
## S3 method for class 'ff_vector'
as.Date(x, ..., inplace = FALSE)
```

**Arguments**

x                    an object of class ff\_vector  
 ...                  other parameters passed on to [as.Date](#)  
 inplace              passed on to [chunkify](#)

**Value**

An ff\_vector of length(x) containing the result of as.Date applied to the elements in chunks

---

as.ffdf.ffdf                    *Trivial implementation, but very handy*

---

**Description**

Coerce a ffd object to an ffd object.

**Usage**

```
## S3 method for class 'ffdf'
as.ffdf(x, ...)
```

**Arguments**

x                    ffd object  
 ...                  not used.

---

as.ram.ffdf                    *As ram for an ffd to get your ffd as a data frame in RAM*

---

**Description**

Load your ffd object in RAM into a data.frame.

**Usage**

```
## S3 method for class 'ffdf'
as.ram(x, ...)
```

**Arguments**

x                    an object of class ffd  
 ...                  not used.

**Value**

a data.frame in RAM

bigglm.ffdf

*Bounded memory linear regression***Description**

bigglm.ffdf creates a generalized linear model object that uses only  $p^2$  memory for  $p$  variables. It uses the biglm package and is a simple wrapper to allow to work with an ffd as input data. Make sure that package is loaded.

**Usage**

```
bigglm.ffdf(formula, data, family = gaussian(), ..., chunksize = 5000)
```

**Arguments**

|           |  |
|-----------|--|
| formula   | a model formula  |
| data      | an object of class ffd   |
| family    | A glm family object  |
| ...       | other parameters passed on to bigglm. See the biglm package: <a href="#">biglm</a> |
| chunksize | Size of chunks for processing the ffd  |

**Value**

An object of class bigglm. See the bigglm package for a description: [bigglm](#)

**See Also**

[bigglm](#)

**Examples**

```
## Not run:

library(biglm)
library(ff)

data(trees)
x <- as.ffdf(trees)
a <- bigglm(log(Volume)~log(Girth)+log(Height),
            data=x, chunksize=10, sandwich=TRUE)
summary(a)

b <- bigglm(log(Volume)~log(Girth)+log(Height)+offset(2*log(Girth)+log(Height)),
            data=x, chunksize=10, sandwich=TRUE)
summary(b)

## End(Not run)
```

---

|            |                                       |
|------------|---------------------------------------|
| binned_sum | <i>Fast summing in different bins</i> |
|------------|---------------------------------------|

---

**Description**

binned\_sum implements fast summing for given bins by calling c-code.

**Usage**

```
binned_sum(x, bin, nbins = max(bin), ...)

## Default S3 method:
binned_sum(x, bin, nbins = max(bin), ...)

## S3 method for class 'ff'
binned_sum(x, bin, nbins = max(bin), ...)
```

**Arguments**

|       |  |
|-------|--|
| x     | numeric vector with the data to be summed              |
| bin   | integer vector with the bin number for each data point |
| nbins | integer maximum bin number                             |
| ...   | used by binned_sum.ff                                  |

**Value**

numeric matrix where each row is a bin

---

|              |   |
|--------------|---|
| binned_sumsq | <i>Fast squared summing in different bins</i> |
|--------------|---|

---

**Description**

binned\_sum implements fast squared summing for given bins by calling c-code, which can be used to calculate variance and standard deviation Please note that incorrect use of this function may crash your R-session. the values of bins must be in between 1:nbins and bin may not contain NA

**Usage**

```
binned_sumsq(x, mean = rep(0, nbins), bin, nbins = max(bin), ...)

## Default S3 method:
binned_sumsq(x, mean = rep(0, nbins), bin, nbins = max(bin), ...)

## S3 method for class 'ff'
binned_sumsq(x, mean = rep(0, nbins), bin, nbins = max(bin), ...)
```

**Arguments**

|       |  |
|-------|--|
| x     | numeric vector with the data to be summed squared  |
| mean  | numeric vector with an optional mean to be subtracted from the data to be summed and squared |
| bin   | integer vector with the bin number for each observation                                      |
| nbins | integer maximum bin number   |
| ...   | will be passed on to the implementation.   |

**Value**

numeric matrix where each row is a bin  
 numeric matrix where each row is a bin  
 numeric matrix where each row is a bin

---

binned\_tabulate      *Fast tabulating in different bins*

---

**Description**

binned\_sum implements fast tabulating for given bins by calling c-code. It also returns the number of NA's per bin. Please note that incorrect use of this function may crash your R-session. the values of bins must be between 1 and nbins and may not contain NA. The values of x must be between 1 and nlevels.

**Usage**

```
binned_tabulate(x, bin, nbins = max(bin), nlevels = nlevels(x), ...)

## Default S3 method:
binned_tabulate(x, bin, nbins = max(bin), nlevels = nlevels(x), ...)

## S3 method for class 'ff'
binned_tabulate(x, bin, nbins = max(bin), nlevels = nlevels(x), ...)
```

**Arguments**

|         |  |
|---------|--|
| x       | factor or integer vector with the data to be tabulated |
| bin     | integer vector with the bin number for each data point |
| nbins   | integer maximum bin number                             |
| nlevels | integer number of levels used in x                     |
| ...     | used by binned_tabulate.ff                             |

**Value**

numeric matrix where each row is a bin and each column a level



---

|        |                              |
|--------|------------------------------|
| byMean | <i>Fast conditional mean</i> |
|--------|------------------------------|

---

**Description**

byMean works like a very fast version of tapply with (weighted) FUN=mean or FUN=weighted.mean.

**Usage**

```
byMean(x, by, na.rm = FALSE, weight = NULL, ...)
```

**Arguments**

|        |   |
|--------|---|
| x      | numeric vector to be averaged                             |
| by     | (list of) factor(s) for which the mean will be calculated |
| na.rm  | logical If TRUE NA values will be removed                 |
| weight | numeric with of same length as x                          |
| ...    | not used  |

**Value**

array with dimensions of by

---

|       |                             |
|-------|-----------------------------|
| bySum | <i>Fast conditional sum</i> |
|-------|-----------------------------|

---

**Description**

bySum works like a very fast version of tapply with (weighted) FUN=sum.

**Usage**

```
bySum(x, by, na.rm = FALSE, weight = NULL, ...)
```

**Arguments**

|        |  |
|--------|--|
| x      | numeric vector to be summed                              |
| by     | (list of) factor(s) for which the sum will be calculated |
| na.rm  | logical If TRUE NA values will be removed                |
| weight | numeric with of same length as x                         |
| ...    | not used   |

**Value**

array with dimensions of by

**Examples**

```
bySum(warpbreaks$breaks, warpbreaks$wool)
bySum(warpbreaks$breaks, warpbreaks[,-1])
```

---

|       |                               |
|-------|-------------------------------|
| c. ff | <i>Concatenate ff vectors</i> |
|-------|-------------------------------|

---

**Description**

Concatenate ff vectors

**Usage**

```
## S3 method for class 'ff'
c(...)
```

**Arguments**

... ff ff vectors to be concatenated

**Value**

a new ff object, data is physically copied

**See Also**

[ffappend](#)

---

|          |  |
|----------|--|
| chunkify | <i>Chunkify an element-wise function</i> |
|----------|--|

---

**Description**

Chunkify creates a new function that operates on a ff vector. It creates chunks from the ff vector and calls the original function fun on each chunk.

**Usage**

```
chunkify(fun)
```

**Arguments**

fun                    function to be 'chunkified', the function must accept a vector and return a vector of the same length

**Value**

'chunkified' function that accepts a ff vector as its first argument.

---

|         |  |
|---------|--|
| compact | <i>Compact a ff vector or ffd data frame</i> |
|---------|--|

---

**Description**

Compact takes a ff vector and tries to use the smallest binary data type for this vector.

**Usage**

```
## S3 method for class 'ff'
compact(x, use.na = TRUE, ...)
```

**Arguments**

x                    ff or ffd object

use.na               logical if TRUE the resulting ff vector can contain NA, otherwise this is not checked

...                   other parameters

**Value**

compact cloned ff vector, or original if no compacting can be done

---

|          |                              |
|----------|------------------------------|
| condMean | <i>Fast conditional mean</i> |
|----------|------------------------------|

---

**Description**

condMean works like a very fast version of tapply with FUN=mean.

**Usage**

```
condMean(x, index, na.rm = FALSE, ...)
```

**Arguments**

|       |   |
|-------|---|
| x     | numeric vector to be averaged                             |
| index | (list of) factor(s) for which the mean will be calculated |
| na.rm | logical If TRUE NA values will be removed                 |
| ...   | not used  |

**Value**

array with dimensions of index

---

|         |                             |
|---------|-----------------------------|
| condSum | <i>Fast conditional sum</i> |
|---------|-----------------------------|

---

**Description**

condSum works like a very fast version of tapply with FUN=sum.

**Usage**

```
condSum(x, index, na.rm = FALSE, ...)
```

**Arguments**

|       |  |
|-------|--|
| x     | numeric vector to be summed                              |
| index | (list of) factor(s) for which the sum will be calculated |
| na.rm | logical If TRUE NA values will be removed                |
| ...   | not used   |

**Value**

array with dimensions of index

**Description**

Cumulative Sums, Products, and Extremes

**Usage**

```
## S3 method for class 'ff'  
cumsum(x, ...)  
  
## S3 method for class 'ff'  
cumprod(x, ...)  
  
## S3 method for class 'ff'  
cummax(x, ...)  
  
## S3 method for class 'ff'  
cummin(x, ...)
```

**Arguments**

`x` ff numeric vector or an object that can be coerced to one a numeric vector  
`...` other parameters passed on to chunk

**Value**

An ff vector of the same length and type as `x` (after coercion), except that `cumprod` returns a numeric vector for integer input.

An NA value in `x` causes the corresponding and following elements of the return value to be NA, as does integer overflow in `cumsum` (with a warning).

**See Also**

[cumsum](#), [cumprod](#), [cummax](#), [cummin](#)

**Examples**

```
x <- 1:10000  
tmp <- cumsum(ff(x))  
class(tmp)  
table(tmp[] == cumsum(x))  
  
x <- rnorm(1000)  
tmp <- cummax(ff(x))  
table(tmp[] == cummax(x))  
tmp <- cummin(ff(x))
```

```
table(tmp[] == cummin(x))
tmp <- cumprod(ff(x))
table(tmp[] == cumprod(x))

## S3 type of calling
cumsum(ff(x))
cummax(ff(x))
cummin(ff(x))
cumprod(ff(x))
```

---

cut.ff

*Convert Numeric ff vector to factor ff*

---

### Description

cut divides the range of x into intervals and codes the values in x according to which interval they fall. The leftmost interval corresponds to level one, the next leftmost to level two and so on.

### Usage

```
## S3 method for class 'ff'
cut(x, breaks, ...)
```

### Arguments

x                    a (numeric) ff object that will be cut into pieces  
breaks                specifies the breaks for cutting this  
...                    other parameters that can be given to [cut.default](#)

### Details

The cut method for ff with the behaviour of `link{cut}`

### Value

ff a new [ff](#) object with the newly created factor

### See Also

cut

---

|         |                           |
|---------|---------------------------|
| diff.ff | <i>Lagged Differences</i> |
|---------|---------------------------|

---

**Description**

Returned suitably lagged and iterated differences

**Usage**

```
## S3 method for class 'ff'
diff(x, lag = 1L, differences = 1L, ...)
```

**Arguments**

|             |   |
|-------------|---|
| x           | a ff vector containing values to be differenced   |
| lag         | a n integer indicating which lag to use           |
| differences | an integer indicating the order of the difference |
| ...         | other parameters will be passed on to diff        |

---

|               |   |
|---------------|---|
| droplevels.ff | <i>The function droplevels is used to drop unused levels from a ff factor or , more commonly, from factors in a ffd</i> |
|---------------|---|

---

**Description**

The function droplevels is used to drop unused levels from a ff factor or , more commonly, from factors in a ffd

**Usage**

```
## S3 method for class 'ff'
droplevels(x, ..., inplace = FALSE)
```

**Arguments**

|         |   |
|---------|---|
| x       | ff object   |
| ...     | not used  |
| inplace | if TRUE the columns will be physically changed, otherwise (default) a new ff vector will be created |

**Value**

ff object where levels of factors are dropped

**See Also**

[droplevels](#) [droplevels.ffd](#)

---

|                 |   |
|-----------------|---|
| droplevels.ffdf | <i>The function droplevels is used to drop unused levels from factors in a <a href="#">ffdf</a></i> |
|-----------------|---|

---

**Description**

The function droplevels is used to drop unused levels from factors in a [ffdf](#)

**Usage**

```
## S3 method for class 'ffdf'
droplevels(x, except = NULL, ..., inplace = FALSE)
```

**Arguments**

|         |  |
|---------|--|
| x       | ffdf object  |
| except  | specify which columns will be excluded from dropping levels  |
| ...     | further arguments passed to <a href="#">droplevels.ff</a>  |
| inplace | if TRUE the columns will be physically changed, otherwise (default) new ff vectors will be created |

**Value**

ffdf object where levels of factors are dropped

**See Also**

[droplevels](#) [droplevels.ff](#)

---

|               |   |
|---------------|---|
| duplicated.ff | <i>Duplicated for ff and ffdf objects</i> |
|---------------|---|

---

**Description**

Duplicated for ff and ffdf objects similar as in [duplicated](#).

Remark that this duplicated function is slightly different from the duplicated method in the base package as it first orders the ffdf or ff\_vector object and then applies duplicated. This means you need to order the ffdf or ff\_vector in case you want to have the exact same result as the result of the base package. See the example.

**Usage**

```
## S3 method for class 'ff'
duplicated(x, incomparables = FALSE, fromLast = FALSE, trace = FALSE, ...)

## S3 method for class 'ffdf'
duplicated(x, incomparables = FALSE, fromLast = FALSE, trace = FALSE, ...)
```



**Arguments**

|               |  |
|---------------|--|
| x             | ff object or ffdof object  |
| incomparables | a vector of values that cannot be compared. FALSE is a special value, meaning that all values can be compared, and may be the only value accepted for methods other than the default. It will be coerced internally to the same type as x. |
| fromLast      | logical indicating if duplication should be considered from the last, i.e., the last (or rightmost) of identical elements will be kept   |
| trace         | logical indicating to show on which chunk the function is computing  |
| ...           | other parameters passed on to chunk  |

**Value**

A logical ff vector of length nrow(x) or length(x) indicating if each row or element is duplicated.

**See Also**

[duplicated](#), [ffdforder](#), [fforder](#)

**Examples**

```
## duplicated.ffdf - mark that you need to order according to the records you
## like in order to have similar results as the base unique method
data(iris)
irisdouble <- rbind(iris, iris)
irisdouble <- irisdouble[ sample(x=1:nrow(irisdouble), size=nrow(irisdouble)
                               , replace = FALSE), ]
ffiris <- as.ffdf(irisdouble)
duplicated(ffiris, by=10, trace=TRUE)
duplicated(ffiris$Sepal.Length, by=10, trace=TRUE)
table(duplicated(irisdouble), duplicated(ffiris, by=10)[])
irisdouble <- irisdouble[order(apply( irisdouble
                                     , FUN=function(x) paste(x, collapse=".")
                                     , MARGIN=1
                                     )), ]

ffiris <- as.ffdf(irisdouble)
table(duplicated(irisdouble), duplicated(ffiris, by=10)[])
table(duplicated(ffiris$Sepal.Width, by=10)[], duplicated(ffiris$Sepal.Width[]))

measures <- c("Sepal.Width", "Species")
irisdouble <- irisdouble[order(apply( irisdouble[, measures]
                                     , FUN=function(x) paste(x, collapse=".")
                                     , MARGIN=1)), ]

ffiris <- as.ffdf(irisdouble)
table(duplicated(irisdouble[, measures]), duplicated(ffiris[measures], by=10)[])
table(duplicated(ffiris$Sepal.Width, by=10)[], duplicated(ffiris$Sepal.Width[]))
```

---

`expand.ffgrid`*Create a ffdof from All Combinations of Factors*

---

### Description

Similar as `expand.grid` in the base package generates an ffdof. Code is almost copy-pasted from [expand.grid](#).

### Usage

```
expand.ffgrid(..., KEEP.OUT.ATTRS = TRUE, stringsAsFactors = TRUE)
```

### Arguments

`...` ff vectors, ff factors or a list containing these.  
`KEEP.OUT.ATTRS` currently ignored  
`stringsAsFactors` logical specifying if character vectors are converted to factors. Irrelevant for ff as character vectors are factors in package ff.

### Value

A ffdof containing one row for each combination of the supplied factors. The first factors vary fastest. The columns are labelled by the factors if these are supplied as named arguments or named components of a list.

### See Also

[expand.grid](#)

### Examples

```
comb <- expand.ffgrid(ff(1:1000), ff(factor(LETTERS)))
dim(comb)

x <- ff(factor(LETTERS))
y <- ff(1:1000)
z <- ff(seq.Date(Sys.Date(), Sys.Date()+10, by = "day"))
comb <- expand.ffgrid(x, y, z)
dim(comb)
comb[1:100, ]

expand.ffgrid(list(a = ff(1:10), b = ff(1:10)))
```

---

|          |  |
|----------|--|
| ffappend | <i>Append a ff vector to another ff vector</i> |
|----------|--|

---

**Description**

Appends (ff) vector y to ff vector x. Please note that the data of x will be coerced to the type of y if y has a higher vmode.

**Usage**

```
ffappend(x, y, adjustvmode = TRUE, ...)
```

**Arguments**

|             |   |
|-------------|---|
| x           | ff object where data will be appended to. If x==NULL a new ff object will be created                      |
| y           | ff object or vector object  |
| adjustvmode | logical, indicating to coerce x to a higher vmode to make sure y is appended without loss of information. |
| ...         | parameter that will be passed on to chunk internally  |

**Value**

ff object with same physical storage as x unless y has a higher vmode in which case the data will be cloned to the higher vmode

**See Also**

[c.ff](#)

---

|            |  |
|------------|--|
| ffdfappend | <i>Append a dataframe or an ffd to another ffd</i> |
|------------|--|

---

**Description**

Appends a dataframe or an ffd called dat to an existing ffd called x. Please note that the data of x will be coerced to the type of y if the corresponding column of y has a higher vmode.

**Usage**

```
ffdfappend(x, dat, recode = TRUE, adjustvmode = TRUE, ...)
```

**Arguments**

|             |  |
|-------------|--|
| x           | ffdf object where data will be appended to. If x==NULL a new ffdff object will be created                                |
| dat         | ffdf object or data.frame object   |
| recode      | should factors be recoded (default), or not (faster)   |
| adjustvmode | logical, indicating to coerce the columns of x to a higher vmode to make sure y is appended without loss of information. |
| ...         | Further arguments passed to <a href="#">as.ffdf</a> , when x==NULL   |

**Value**

ffdf object with same physical storage as x unless the corresponding column of y has a higher vmode in which case the data will be cloned to the higher vmode

**See Also**

[c.ff](#)

---

ffdfply

*Performs a split-apply-combine on an ffdff*


---

**Description**

Performs a split-apply-combine on an ffdff. Splits the x ffdff according to split and applies FUN to the data, stores the result of the FUN in an ffdff.

Remark that this function does not actually split the data. In order to reduce the number of times data is put into RAM for situations with a lot of split levels, the function extracts groups of split elements which can be put into RAM according to BATCHBYTES. Please make sure your FUN covers the fact that several split elements can be in one chunk of data on which FUN is applied.

Mark also that NA's in the split are not considered as a split on which the FUN will be applied.

**Usage**

```
ffdfply(
  x,
  split,
  FUN,
  BATCHBYTES = getOption("ffbatchbytes"),
  RECORDBYTES = sum(.rambytes[vmode(x)]),
  trace = TRUE,
  ...
)
```

**Arguments**

|             |   |
|-------------|---|
| x           | an ffd  |
| split       | an ff vector which is part of the ffd x   |
| FUN         | the function to apply to each split. This function needs to return a data.frame |
| BATCHBYTES  | integer scalar limiting the number of bytes to be processed in one chunk        |
| RECORDBYTES | optional integer scalar representing the bytes needed to process one row of x   |
| trace       | logical indicating to show on which split the function is computing             |
| ...         | other parameters passed on to FUN   |

**Value**

an ffd

**See Also**

[grouprunningcumsum](#), [table](#)

**Examples**

```
data(iris)
ffiris <- as.ffdf(iris)

youraggregatorFUN <- function(x){
  dup <- duplicated(x[c("Species", "Petal.Width")])
  o <- order(x$Petal.Width)
  lowest_pw <- x[rev(o),][!dup,]
  highest_pw <- x[o,][!dup,]
  lowest_pw$group <- factor("lowest", levels=c("lowest", "highest"))
  highest_pw$group <- factor("highest", levels=c("lowest", "highest"))
  rbind(lowest_pw, highest_pw)
}
result <- ffdply( x = ffiris, split = ffiris$Species,
                 FUN = function(x) youraggregatorFUN(x),
                 BATCHBYTES = 5000, trace=TRUE)

dim(result)
dim(iris)
result[1:10,]

ffiris$integerkey <- with(ffiris, as.integer(Sepal.Length))
result <- ffdply( x = ffiris, split = as.character(ffiris$integerkey)
                 , FUN = function(x) youraggregatorFUN(x), BATCHBYTES = 5000
                 , trace=TRUE
                 )

ffiris$datekey <- ff( as.Date(ffiris$Sepal.Length[,], origin = "1970-01-01"),
                    vmode = "integer")
result <- ffdply( x = ffiris, split = as.character(ffiris$datekey)
                 , FUN = function(x) youraggregatorFUN(x)
                 , BATCHBYTES = 5000, trace=TRUE
                 )
```

---

|                            |   |
|----------------------------|---|
| <code>ffdfbind.fill</code> | <i>rbind for ffdf where missing columns are added if not available in one of the ffdf objects</i> |
|----------------------------|---|

---

### Description

rbind for ffdf where missing columns are added if not available in one of the ffdf objects. Similarly as rbind.fill but for ffdf objects

### Usage

```
ffdfbind.fill(..., clone = TRUE)
```

### Arguments

|                    |  |
|--------------------|--|
| <code>...</code>   | 2 or more ffdf objects   |
| <code>clone</code> | logical, indicating to clone the first ffdf object in ... or not before appending the other objects. Defaults to TRUE. |

### Value

an ffdf where the ffdf objects are rbind-ed together. Missing columns in either one of the passed ffdf objects are set to NA values.

### Examples

```
x <- ffdfrbind.fill( as.ffdf(iris),
                    as.ffdf(iris[, c("Sepal.Length", "Sepal.Width"
                                     , "Petal.Length")]))

class(x)
nrow(x)
sum(is.na(x$Petal.Width))
```

---

|                       |  |
|-----------------------|--|
| <code>ffdfsave</code> | <i>Save a ffdf data.frame in directory</i> |
|-----------------------|--|

---

### Description

ffdfsave saves a ffdf data.frame in the given filename (.rdata) and stores all ff columns in a subdirectory with the name "<filename>\_ff". Each column will be named "<columnname>.ff". A saved ffdf data.frame is a .rdata file and can be loaded with the load function `Deprecated`, the preferred method is `save.ffdf`

**Usage**

```
ffdfsave(dat, filename)
```

**Arguments**

|          |   |
|----------|---|
| dat      | ffdf data.frame, to be saved  |
| filename | path where .rdata file will be save and <filename>_ff directory will be created |

---

|          |   |
|----------|---|
| ffdfwith | <i>Evaluate an expression in a ffd data environment</i> |
|----------|---|

---

**Description**

Evaluate an R expression in an environment constructed from a ffd data frame. Faster than [with.ffdf](#), but in contrast ffdwith can change the original data. Please note that ffdwith assumes that the result must be of the same length as `nrow(data)`. You should write your expression as if it is a normal `data.frame`. The resulting return value however will be a ffd object.

**Usage**

```
ffdfwith(data, expr, ...)
```

**Arguments**

|      |   |
|------|---|
| data | ffdf data object used as an environment for evaluation. |
| expr | expression to evaluate.                                 |
| ...  | arguments to be passed to future methods.               |

**Value**

if expression is a vector a newly created ff vector will be returned otherwise if the expression is a `data.frame` a newly created ffd object will be returned.

**Examples**

```
dat <- data.frame(x=1:10, y=10:1)
ffdat <- as.ffdf(dat)

ffdfwith(ffdat, {
  x <- x + 1
  x + y
})

#notice that x has been altered
ffdat$x
```

---

`ffifelse`*Conditional Element Selection for ff vectors.*

---

**Description**

Similar as `ifelse` in the base package but only works with `yes` and `no` as `ff` vectors.

**Usage**

```
ffifelse(test, yes, no)
```

**Arguments**

|                   |   |
|-------------------|---|
| <code>test</code> | logical or boolean <code>ff</code> vector   |
| <code>yes</code>  | an <code>ff</code> vector with return values for true elements of <code>test</code> . If too short, their elements are recycled.  |
| <code>no</code>   | an <code>ff</code> vector with return values for false elements of <code>test</code> . If too short, their elements are recycled. |

**Value**

An `ff` vector of the same length as `test`.

**See Also**

[ifelse](#)

**Examples**

```
data(iris)
ffiris <- as.ffdf(iris)
ffifelse(ffiris$Sepal.Length < 5, TRUE, NA)
ffifelse(ffiris$Sepal.Length < 5, factor(rep("abc", nrow(ffiris))), NA)
ffifelse(ffiris$Sepal.Length < 5, Sys.Date(), factor("abc"))
ffifelse(ffiris$Sepal.Length < 5, Sys.Date(), ff(seq.Date( Sys.Date()+1
, Sys.Date()+nrow(ffiris), by = "day")))
```



## Description

ffmatch returns an ff vector of the positions of (first) matches of its first argument in its second. Similar as [match](#).

ffdfmatch allows to match ffd objects by [paste](#)-ing together the columns of the ffd and matching on the pasted column and returns an ff vector of the positions of (first) matches of its first argument in its second.

%in% returns a logical ff vector indicating if there is a match or not for its left operand. ffd objects are also allowed in the left and right operand of the %in% operator. See the examples.

## Usage

```
ffmatch(
  x,
  table,
  nomatch = NA_integer_,
  incomparables = NULL,
  trace = FALSE,
  ...
)
```

```
ffdfmatch(
  x,
  table,
  nomatch = NA_integer_,
  incomparables = NULL,
  trace = FALSE,
  ...
)
```

```
x %in% table
```

## Arguments

|               |   |
|---------------|---|
| x             | a ff object for ffmatch or an ffd object for ffdmatch   |
| table         | a ff object for ffmatch or an ffd object for ffdmatch   |
| nomatch       | the value to be returned in the case when no match is found. Note that it is coerced to integer.  |
| incomparables | a vector of values that cannot be matched. Any value in x matching a value in this vector is assigned the nomatch value. For historical reasons, FALSE is equivalent to NULL. |

trace            logical indicating to show on which chunk the function is computing  
 ...            other parameters passed on to chunk

### Value

An ff vector of the same length as x. An integer vector giving the position in table of the first match if there is a match, otherwise nomatch.

### See Also

[match](#), [paste](#)

### Examples

```
## Basic example of match.ff
x.ff <- ffmach( as.ff(as.factor(c(LETTERS, NA)))
               , as.ff(as.factor(c("C", "B", "Z", "X", "HMM", "Nothing", NA)))
               , trace=TRUE
               , BATCHBYTES=20)

class(x.ff)
x <- match(c(LETTERS, NA), c("C", "B", "Z", "X", "HMM", "Nothing", NA))
table(x.ff[] == x, exclude=c())
## ffdmatch also allows to input an ffd
data(iris)
ffiris <- as.ffdf(iris)
ffirissubset <- as.ffdf(iris[c(1:10, nrow(iris)), ])
ffdfmatch(ffiris, ffirissubset, trace=TRUE, BATCHBYTES=500)

## %in% is masked from the base package
letter <- factor(c(LETTERS, NA))
check <- factor(c("C", "B", "Z", "X", "HMM", "Nothing", NA))
letter %in% check
as.ff(letter) %in% as.ff(check)

ffiris %in% ffirissubset
```

---

ffrandom

*Generate ff vector with draws from distribution*

---

### Description

A convenience function to generate ff vectors with draws from random distributions using functions such as [runif](#), [rnorm](#) and [rlnorm](#).

### Usage

```
ffrandom(n, rfun = runif, ..., vmode = NULL)
```

**Arguments**

|       |  |
|-------|--|
| n     | number of observations   |
| rfunc | a function generating the draws from the random distribution. This function should expect the number of draws as its first argument. Valid examples are the routines <code>runif</code> , <code>rnorm</code> , and <code>rlnorm</code> . |
| ...   | additional arguments are passed on to rfunc.   |
| vmode | the vmode of the resulting vector. See <code>ff</code> . If none given the vmode is determined from a single draw from rfunc.  |

**Details**

Before generating the vector a single draw is taken from the distribution. This might be important if one tries to reproduce draws directly from rfunc.

**Value**

An ff vector with draws from the distribution.

**Examples**

```
n <- ffrandom(1E3, rnorm, mean = 10, sd = 5)

set.seed(123)
runif(1)
a <- runif(10)
set.seed(123)
b <- ffrandom(10, runif)
identical(a, b[])
```

---

ffrep.int

*Replicate Elements of ff vectors.*


---

**Description**

Similar as `rep.int` in the base package but for ff vectors.

**Usage**

```
ffrep.int(x, times)
```

**Arguments**

|       |  |
|-------|--|
| x     | an integer ff vector   |
| times | integer ff vector giving the (non-negative) number of times to repeat each element if of length <code>length(x)</code> , or an integer of length 1 indicating how many times to repeat the whole vector. Negative or NA values are an error. |

**Value**

An ff vector of integers where x is recycled

**See Also**

[rep.int](#)

**Examples**

```
ffrep.int(ff(1:1000), times=20)
ffrep.int(ff(factor(LETTERS)), times=20)
ffrep.int(ff(Sys.time()), times=20)
ffrep.int(ff(seq.Date(Sys.Date(), Sys.Date()+10, by = "day")), times=20)

x <- ff(factor(LETTERS), length=26)
ffrep.int(x, times=ff(1:26))

## Or supply an ff vector of the same length as x
x <- seq.Date(Sys.Date(), Sys.Date()+10, by = "day")
x <- as.ff(x)
ffrep.int(x, times=ff(0:10))

x <- ff(factor(LETTERS), length=26)
ffrep.int(x, times=ff(1:26))
```

---

ffseq

*Sequence Generation of ff vectors.*

---

**Description**

Similar as seq in the base package, generating an ff vector.

**Usage**

```
ffseq(
  from = 1,
  to = 1,
  by = ((to - from)/(length.out - 1)),
  length.out = NULL,
  along.with = NULL,
  ...
)
```

**Arguments**

|            |  |
|------------|--|
| from       | the starting value of the sequence   |
| to         | the end (maximal) value of the sequence  |
| by         | number, increment of the sequence  |
| length.out | desired length of the sequence. Only non-negative numbers larger than 0 are allowed. |
| along.with | take the length from the length of this argument                                     |
| ...        | arguments passed to or from methods  |

**Value**

An ff vector with the generated sequence, similar as what seq generates but as an ff vector.  
Mark: in case this would generate a sequence of length 0, will return integer().

**See Also**

[seq](#)

**Examples**

```
## ffseq_len
ffseq_len(1000)
ffseq_len(1000000)

## ffseq
ffseq(from = 1, to = 4, by = 1)
ffseq(from = 1, to = 4, by = 0.5)
ffseq(from = 4, to = 1, by = -0.5)
ffseq(from = -100, to = 100, by = 0.3)
ffseq(from = 2, to = -100, length.out = 4)
ffseq(from = 2, to = -100, length.out = 4)
ffseq(from = 2, along.with=1000)
ffseq(to = 2, along.with=1000)
ffseq(along.with=1000)
ffseq(length.out=1000000)
```

---

ffseq\_len

*Sequence Generation of ff vectors.*

---

**Description**

Similar as seq\_len in the base package, generating an ff vector.

**Usage**

```
ffseq_len(length.out)
```

**Arguments**

length.out      desired length of the sequence. Only non-negative numbers larger than 0 are allowed.

**Value**

An ff vector of integers with range from 1 to length.out

**See Also**

[seq\\_len](#)

**Examples**

```
## ffseq_len
ffseq_len(1000)
ffseq_len(1000000)

## ffseq
ffseq(from = 1, to = 4, by = 1)
ffseq(from = 1, to = 4, by = 0.5)
ffseq(from = 4, to = 1, by = -0.5)
ffseq(from = -100, to = 100, by = 0.3)
ffseq(from = 2, to = -100, length.out = 4)
ffseq(from = 2, to = -100, length.out = 4)
ffseq(from = 2, along.with=1000)
ffseq(to = 2, along.with=1000)
ffseq(along.with=1000)
ffseq(length.out=1000000)
```

---

ffwhich

---

*Create an index from a filter statement*


---

**Description**

ffwhich creates an **ff** integer index vector from a filter expression. The resulting vector can be used to index or subset a ffd or ff vector.

**Usage**

```
ffwhich(x, expr, ...)
```

**Arguments**

x                ff or ffd object  
 expr            R code that evaluates to a logical  
 ...             not used

**See Also**

ffindexget ffindexset

**Examples**

```
# create a ff vector
x <- ff(10:1)
# make an ff index vector
idx <- ffwhich(x, x < 5)
# use it to retrieve values from x
x[idx][]

# create a ffd data.frame
dat <- ffd(x1=x, y1=x)
# create an ff index vector from a filter statement
idx <- ffwhich(dat, x1 < 5 & y1 > 2)
# use it to select data from the data.frame
dat[idx,][,]
```

---

format.ff\_vector

*Date Conversion Functions for ff vector*

---

**Description**

Date Conversion Functions for ff vector.

**Usage**

```
## S3 method for class 'ff_vector'
format(x, ..., inplace = FALSE)
```

**Arguments**

|         |  |
|---------|--|
| x       | an object of class ff_vector                         |
| ...     | other parameters passed on to <a href="#">format</a> |
| inplace | passed on to <a href="#">chunkify</a>                |

**Value**

An ff\_vector of length(x) containing the result of format applied to the elements in chunks

---

|                    |   |
|--------------------|---|
| grouprunningcumsum | <i>Groups the input integer vector into several groups if the running cumulative sum increases a certain maximum number</i> |
|--------------------|---|

---

**Description**

Groups the input integer vector into several groups if the running cumulative sum increases a certain maximum number

**Usage**

```
grouprunningcumsum(x, max)
```

**Arguments**

|     |  |
|-----|--|
| x   | an integer vector  |
| max | the maximum running cumulative size before an extra grouping is done |

**Value**

An integer vector of the same length of x, indicating groups

---

|         |                            |
|---------|----------------------------|
| hist.ff | <i>hist for ff vectors</i> |
|---------|----------------------------|

---

**Description**

Currently this is a simple version of [hist](#) functionality.

**Usage**

```
## S3 method for class 'ff'
hist(x, breaks = min(100, length(x)), plot = TRUE, ...)
```

**Arguments**

|        |   |
|--------|---|
| x      | ff vector of values for which the histogram is desired  |
| breaks | a single numer given the number of cells for the histogram  |
| plot   | logical. If TRUE (default), a histogram is plotted, otherwise a list of breaks and counts is returned |
| ...    | further arguments supplied to plot.   |

**Value**

histogram object



---

|      |   |
|------|---|
| ikey | <i>Creates a unique integer key for unique combinations of rows of an ffd</i> |
|------|---|

---

### Description

Creates a unique integer key for unique combinations of rows of an ffd. In database terms this would correspond to a primary or foreign key.

Orders the ffd decreasingly alongside the columns with NA's as last in the order and creates the integer key.

### Usage

```
ikey(x, ...)
```

### Arguments

|     |                                     |
|-----|-------------------------------------|
| x   | an ffd                              |
| ... | other parameters passed on to chunk |

### Value

An integer ff vector of the same length as the number of rows in x with unique values for each unique row

### Examples

```
oldffmaxbytes <- getOption("ffmaxbytes")
options(ffmaxbytes = 20)
ffiris <- as.ffdf(iris)
ffiris$key1 <- ikey(ffiris)
ffiris$key2 <- ikey(ffiris[c("Petal.Width", "Species")])
unique(ffiris[c("key2", "Petal.Width", "Species")])[,]
options(ffmaxbytes = oldffmaxbytes)
```

---

|          |  |
|----------|--|
| is.na.ff | <i>'Not Available' / Missing Values for ff vectors</i> |
|----------|--|

---

### Description

The generic function is.na indicates which elements are missing.

The generic function is.na<- sets elements to NA.

**Usage**

```
## S3 method for class 'ff'
is.na(x, ...)

## S3 replacement method for class 'ff'
is.na(x, ...) <- value
```

**Arguments**

```
x                a ff vector
...              other parameters passed on to chunk
value            a suitable ff index vector for use with x
```

**Value**

A logical ff vector of the same length of x indicating if the ff vector contains missing values.

**See Also**

[is.na](#), [ffvecapply](#)

**Examples**

```
is.na.ff(ff(c(NA, 1:100)), BATCHBYTES=20, VERBOSE=TRUE)
## S3 generic
is.na(ff(c(NA, 1:100)))
## Assign a missing value
x <- ff(c(NA, 1:100))
is.na(x) <- ff(c(3,5))
x
is.na(x) <- 7:8
x
```

---

laf\_to\_ffdf

*Use LaF to import data into ffdF data.frame*

---

**Description**

Use LaF to import data into a [ffdf](#) data.frame

**Usage**

```
laf_to_ffdf(laf, x = NULL, nrows = 1e+05, transFUN = NULL, ...)
```

**Arguments**

|          |  |
|----------|--|
| laf      | laf object pointing to a csv or fwf file   |
| x        | optional, <a href="#">ffdf</a> object where laf data should be appended to.  |
| nrows,   | number of rows per block, passed on to <code>next_block</code>   |
| transFUN | NULL or a function that is called on each data.frame chunk which is read in using <code>next_block</code> . This can be used for filtering and data transformations. |
| ...      | passed on to <code>next_block</code>   |

---

|           |  |
|-----------|--|
| load.ffdf | <i>Loads ffdf data.frames from a directory</i> |
|-----------|--|

---

**Description**

`load.ffdf` loads ffdf data.frames from the given `dir`, that were stored using [save.ffdf](#). Each column is stored as with filename `<ffdfname>${<colname>.ff`. All variables are stored in `.RData` in the same directory. The data can be loaded by starting a R session in the directory or by using [load.ffdf](#).

**Usage**

```
load.ffdf(dir, envir = parent.frame())
```

**Arguments**

|       |   |
|-------|---|
| dir   | path from where the data should be loaded                   |
| envir | environment where the stored variables will be loaded into. |

**See Also**

[load.ffdf](#)

**Examples**

```
iris.ffdf <- as.ffdf(iris)

td <- tempfile()

# save the ffdf into the supplied directory
save.ffdf(iris.ffdf, dir=td)

# what in the directory?
dir(td)

#remove the ffdf from memory
rm("iris.ffdf")

# and reload the stored ffdf
```

```
load.ffdf(dir=td)

tf <- paste(tempfile(), ".zip", sep="")
packed <- pack.ffdf(file=tf, iris.ffdf)

#remove the ffdf from memory
rm("iris.ffdf")

# restore the ffdf from the packed ffdf
unpack.ffdf(tf)
```

---

mean.ff

*Mean of ff vector*

---

### Description

Mean of ff vector

### Usage

```
## S3 method for class 'ff'
mean(x, trim = 0, ..., range = NULL)
```

### Arguments

|       |  |
|-------|--|
| x     | a ff vector  |
| trim  | percentage of robustness, between 0 and 1  |
| ...   | other arguments passed to mean   |
| range | a ri or an integer vector of length==2 giving a range restriction for chunked processing |

### Value

mean value

### Examples

```
# create a vector of length 10 million
x <- ff(vmode="double", length=1e7)

mean(x)
```

---

|            |  |
|------------|--|
| merge.ffdf | <i>Merge two ffdf by common columns, or do other versions of database join operations.</i> |
|------------|--|

---

### Description

Merge two ffdf by common columns, or do other versions of database join operations. This method is similar to [merge](#) in the base package but only allows inner and left outer joins. Note that joining is done based on [ffmatch](#) or [ffdfmatch](#): only the first element in y will be added to x; and since [ffdfmatch](#) works by [paste](#)-ing together a key, this might not be suited if your key contains columns of vmode double.

### Usage

```
## S3 method for class 'ffdf'
merge(
  x,
  y,
  by = intersect(names(x), names(y)),
  by.x = by,
  by.y = by,
  all = FALSE,
  all.x = all,
  all.y = all,
  sort = FALSE,
  suffixes = c(".x", ".y"),
  incomparables = NULL,
  trace = FALSE,
  ...
)
```

### Arguments

|       |  |
|-------|--|
| x     | an ffdf  |
| y     | an ffdf  |
| by    | specifications of the common columns. Columns can be specified by name, number or by a logical vector.   |
| by.x  | specifications of the common columns of the x ffdf, overruling the by parameter  |
| by.y  | specifications of the common columns of the y ffdf, overruling the by parameter  |
| all   | see <a href="#">merge</a> in R base  |
| all.x | if TRUE, then extra rows will be added to the output, one for each row in x that has no matching row in y. These rows will have NAs in those columns that are usually filled with values from y. The default is FALSE, so that only rows with data from both x and y are included in the output. |
| all.y | similar as all.x   |

|               |   |
|---------------|---|
| sort          | logical, currently not used yet, defaults to FALSE.                               |
| suffixes      | character(2) specifying the suffixes to be used for making non-by names() unique. |
| incomparables | values which cannot be matched. See <a href="#">match</a> . Currently not used.   |
| trace         | logical indicating to show on which chunk the function is computing               |
| ...           | other options passed on to <a href="#">ffdfindexget</a>                           |

### Details

If a left outer join is performed and no matching record in *x* is found in *y*, columns with *vmodes* 'boolean', 'quad', 'nibble', 'ubyte', 'ushort' are coerced respectively to *vmode* 'logical', 'byte', 'byte', 'short', 'integer' to allow NA values.

### Value

an *ffdf*

### See Also

[merge](#)

### Examples

```
authors <- data.frame(
  surname = c("Tukey", "Venables", "Tierney", "Ripley", "McNeil"),
  nationality = c("US", "Australia", "US", "UK", "Australia"),
  deceased = c("yes", rep("no", 4)), stringsAsFactors = TRUE)
books <- data.frame(
  name = c("Tukey", "Venables", "Tierney",
           "Ripley", "Ripley", "McNeil", "R Core"),
  title = c("Exploratory Data Analysis",
            "Modern Applied Statistics ...",
            "LISP-STAT",
            "Spatial Statistics", "Stochastic Simulation",
            "Interactive Data Analysis",
            "An Introduction to R"),
  other.author = c(NA, "Ripley", NA, NA, NA, NA,
                  "Venables & Smith"), stringsAsFactors = TRUE)
books <- lapply(1:100, FUN=function(x, books){
  books$price <- rnorm(nrow(books))
  books
}, books=books)
books <- do.call(rbind, books)
authors <- as.ffdf(authors)
books <- as.ffdf(books)

dim(books)
dim(authors)
## Inner join
oldffbatchbytes <- getOption("ffbatchbytes")
options(ffbatchbytes = 100)
m1 <- merge( books, authors, by.x = "name", by.y = "surname"
```

```

      , all.x=FALSE, all.y=FALSE, trace = TRUE)
dim(m1)
unique(paste(m1$name[], m1$nationality[]))
unique(paste(m1$name[], m1$deceased[]))
m2 <- merge( books[,], authors[,], by.x = "name", by.y = "surname"
            , all.x=FALSE, all.y=FALSE, sort = FALSE)
dim(m2)
unique(paste(m2$name[], m2$nationality[]))
unique(paste(m2$name[], m2$deceased[]))
## Left outer join
m1 <- merge( books, authors, by.x = "name", by.y = "surname"
            , all.x=TRUE, all.y=FALSE, trace = TRUE)
class(m1)
dim(m1)
names(books)
names(m1)
unique(paste(m1$name[], m1$nationality[]))
unique(paste(m1$name[], m1$deceased[]))

authors$test <- ff(TRUE, length=nrow(authors), vmode = "logical")
m1 <- merge( books, authors, by.x = "name", by.y = "surname"
            , all.x=TRUE, all.y=FALSE, trace = TRUE)
vmode(m1$test)
table(m1$test[], exclude=c())
options(ffbatchbytes = oldffbatchbytes)

```

---

min.ff

*Minimum, maximum and range of ff vector*


---

## Description

default behaviour of [min,max](#) and [range](#)

## Usage

```

## S3 method for class 'ff'
min(x, ..., na.rm = FALSE, range = NULL)

```

## Arguments

|       |   |
|-------|---|
| x     | a ff object   |
| ...   | optional other (ff) objects   |
| na.rm | should NA be removed?   |
| range | a <code>ri</code> or an integer vector of length==2 giving a range restriction for chunked processing |

## Value

minimum, maximum or range values

**Examples**

```
x <- ff(1:100)

min(x)
max(x)
range(x)

is.na(x) <- 10
min(x)
max(x)
range(x)

min(x, na.rm=TRUE)
max(x, na.rm=TRUE)
range(x, na.rm=TRUE)
```

---

```
move.ffdf
```

```
Moves all the columns of ffd data.frames into a directory
```

---

**Description**

move.ffdf saves all columns into the given dir. Each column is stored as with filename <ffdf-name>\${<colname>.ff. If you want to store the data for an other session please use [save.ffdf](#) or [pack.ffdf](#)

**Usage**

```
move.ffdf(
  x,
  dir = ".",
  name = as.character(substitute(x)),
  relativepath = FALSE
)
```

**Arguments**

|              |   |
|--------------|---|
| x            | ffdf data.frame to be moved   |
| dir          | path were all of supplied ffd's, will be saved. It will be created if it doesn't exist. |
| name         | name to be used as data.frame name  |
| relativepath | If TRUE the ffd will contain relativepaths. Use with care...                            |

**See Also**

[load.ffdf](#) [save.ffdf](#)



## Examples

```
iris.ffdf <- as.ffdf(iris)

td <- tempfile()

# save the ffdf into the supplied directory
save.ffdf(iris.ffdf, dir=td)

# what in the directory?
dir(td)

#remove the ffdf from memory
rm("iris.ffdf")

# and reload the stored ffdf
load.ffdf(dir=td)

tf <- paste(tempfile(), ".zip", sep="")
packed <- pack.ffdf(file=tf, iris.ffdf)

#remove the ffdf from memory
rm("iris.ffdf")

# restore the ffdf from the packed ffdf
unpack.ffdf(tf)
```

---

pack.ffdf

*Packs ffdf data.frames into a compressed file*

---

## Description

pack.ffdf stores ffdf data.frames into the given file for easy archiving and movement of data. The file can be restored using [unpack.ffdf](#). If file ends with ".zip", the package will be zipped otherwise it will be tar.gz-ed.

## Usage

```
pack.ffdf(file, ...)
```

## Arguments

|      |                                  |
|------|----------------------------------|
| file | packaged file, zipped or tar.gz. |
| ...  | ff objects to be packed          |

## See Also

[save.ffdf](#) [unpack.ffdf](#)

**Examples**

```

iris.ffdf <- as.ffdf(iris)

td <- tempfile()

# save the ffdf into the supplied directory
save.ffdf(iris.ffdf, dir=td)

# what in the directory?
dir(td)

#remove the ffdf from memory
rm("iris.ffdf")

# and reload the stored ffdf
load.ffdf(dir=td)

tf <- paste(tempfile(), ".zip", sep="")
packed <- pack.ffdf(file=tf, iris.ffdf)

#remove the ffdf from memory
rm("iris.ffdf")

# restore the ffdf from the packed ffdf
unpack.ffdf(tf)

```

---

quantile.ff

*quantiles*


---

**Description**

The function `quantile` produces quantiles corresponding to the given probabilities. The smallest observation corresponds to a probability of 0 and the largest to a probability of 1. Current implementation doesn't use the type parameter of `quantile`. For large `ff` vectors the difference between the types is (very) small. If `x` has been `ffordered`, `quantile` is fast, otherwise it is  $\$n \log(n)$ .

**Usage**

```

## S3 method for class 'ff'
quantile(x, probs = seq(0, 1, 0.25), na.rm = FALSE, names = TRUE, ...)

```

**Arguments**

|                    |   |
|--------------------|---|
| <code>x</code>     | ff vector   |
| <code>probs</code> | numeric vector of probabilities with values in [0,1].   |
| <code>na.rm</code> | logical; if true, any NA and NaN's are removed from <code>x</code> before the quantiles are computed. |

|       |   |
|-------|---|
| names | logical; if true, the result has a names attribute. Set to FALSE for speedup with many probs. |
| ...   | currently not used  |

---

rle\_ff *Compute the lengths and values of runs of equal values in a vector*

---

### Description

Similar [rle](#) in the base package but for [ff](#) vectors.

### Usage

```
rle_ff(x, ...)
```

### Arguments

x an [ff](#) vector  
... further arguments are passed on the [chunk](#)

### Value

An object of class `rle` which is a list with components

**lengths** an integer vector containing the length of each run.

**values** a vector of the same length as ‘lengths’ with the corresponding values.

### Note

The resulting `rle` object is a memory object and must fit into memory.

### See Also

[rle](#) for an implementation that runs on ordinary vectors.

---

 save.ffdf

*Save ffdf data.frames in a directory*


---

### Description

save.ffdf saves all ffdf data.frames in the given dir. Each column is stored as with filename <ffdfname>\${colname}.ff. All variables given in "..." are stored in ".RData" in the same directory. The data can be reloaded by starting a R session in the directory or by using [load.ffdf](#). Note that calling save.ffdf multiple times for the same directory will only store the ffdf's that were given in the last call.

### Usage

```
save.ffdf(
  ...,
  dir = "./ffdb",
  clone = FALSE,
  relativepath = TRUE,
  overwrite = FALSE
)
```

### Arguments

|              |  |
|--------------|--|
| ...          | ffdf data.frames, ff vectors, or other variables to be saved in the directory  |
| dir          | path where .RData file will be saved and all columns of supplied ffdf's. It will be created if it doesn't exist.   |
| clone        | should the ff vectors be <a href="#">clone</a> 'd, creating a snapshot of the supplied ffdf or ff objects? This should only be necessary if you still need the ff vectors in their current storage location. |
| relativepath | logical if TRUE the stored ff vectors will have relative paths, making moving the data to another storage a simple copy operation.   |
| overwrite    | logical If TRUE save.ffdf will overwrite an previous stored ffdf, .Rdata file.   |

### Details

Using save.ffdf automatically sets the [finalizers](#) of the ff vectors to "close". This means that the data will be preserved on disk when the object is removed or the R sessions is closed. Data can be deleted either using [delete](#) or by removing the directory where the object were saved (dir).

### Note

When saving in the temporary directory pointed at by `getOption("fftempdir")`, ff assumes that the resulting files are to be deleted. Be sure to change the finalizers of the ff vectors when saving in the temporary directory.

**See Also**[load.ffdf](#)**Examples**

```
iris.ffdf <- as.ffdf(iris)

td <- tempfile()

# save the ffdf into the supplied directory
save.ffdf(iris.ffdf, dir=td)

# what in the directory?
dir(td)

#remove the ffdf from memory
rm("iris.ffdf")

# and reload the stored ffdf
load.ffdf(dir=td)

tf <- paste(tempfile(), ".zip", sep="")
packed <- pack.ffdf(file=tf, iris.ffdf)

#remove the ffdf from memory
rm("iris.ffdf")

# restore the ffdf from the packed ffdf
unpack.ffdf(tf)
```

---

set\_ffbase\_logging      *sets the logging of ffbase*

---

**Description**

sets the logging of ffbase

**Usage**

```
set_ffbase_logging(level = c("info"), logger = if (interactive()) cat)
```

**Arguments**

|        |  |
|--------|--|
| level  | logging level: info/debug  |
| logger | function to be called for logging statements, by default this is cat |

---

|           |  |
|-----------|--|
| subset.ff | <i>Subsetting a ff vector or ffdffdata frame</i> |
|-----------|--|

---

**Description**

Subsetting a ff vector or ffdffdata frame

**Usage**

```
## S3 method for class 'ff'
subset(x, subset, ...)
```

**Arguments**

|        |   |
|--------|---|
| x      | ff vector or ffdff data.frame to be subset                              |
| subset | an expression, ri, bit or logical ff vector that can be used to index x |
| ...    | not used  |

**Value**

a new ff vector containing the subset, data is physically copied

---

|        |                                  |
|--------|----------------------------------|
| sum.ff | <i>Sum of ff vector Elements</i> |
|--------|----------------------------------|

---

**Description**

sum returns the sum of all the values present in its arguments.

**Usage**

```
## S3 method for class 'ff'
sum(x, ..., na.rm = FALSE, range = NULL)
```

**Arguments**

|       |  |
|-------|--|
| x     | a ff object  |
| ...   | optional other (ff) objects  |
| na.rm | should NA be removed?  |
| range | a ri or an integer vector of length==2 giving a range restriction for chunked processing |

**Value**

sum of elements

---

|       |  |
|-------|--|
| table | <i>Cross Tabulation and Table Creation</i> |
|-------|--|

---

### Description

Upgrades table to a generic function and implements a method for ff vectors which works for ff factors. For other arguments passed on to table, uses [table](#)

### Usage

```
table(..., exclude = if (useNA == "no") c(NA, NaN),  
      useNA = c("no", "ifany", "always"), dnn = list.names(...), deparse.level = 1)
```

```
table(..., exclude = if (useNA == "no") c(NA, NaN),  
      useNA = c("no", "ifany", "always"), dnn = list.names(...), deparse.level = 1)
```

### Arguments

|               |                           |
|---------------|---------------------------|
| ...           | ff factors or ff integers |
| exclude       | see <a href="#">table</a> |
| useNA         | see <a href="#">table</a> |
| dnn           | see <a href="#">table</a> |
| deparse.level | see <a href="#">table</a> |

### Details

table.ff uses the cross-classifying factors to build a contingency table of the counts at each combination of factor levels.

If ... does not contain factors, unique.ff will add a levels attribute to the non-factors.

### Value

[table](#) object

### See Also

[table](#)

---

|             |                                  |
|-------------|----------------------------------|
| tabulate.ff | <i>Tabulation for ff vectors</i> |
|-------------|----------------------------------|

---

### Description

tabulate.ff takes the integer-valued ff vector bin and counts the number of times each integer occurs in it.

### Usage

```
tabulate.ff(bin, nbins = max(bin, 1), na.rm = TRUE))
```

### Arguments

|       |                      |
|-------|----------------------|
| bin   | factor to be binned. |
| nbins | number of bins       |

### Details

Behaviour of [tabulate](#)

### Value

integer vector or if FFRETURN is TRUE a ff vector

### Examples

```
#create a vector of 10 million
x <- ff(vmode="integer", length=1e7)

# fill first 200 with values
x[1:100] <- 1
x[101:200] <- 2

# lets count
tabulate.ff(x)
```



---

|                |                                    |
|----------------|------------------------------------|
| transform.ffdf | <i>Transform a ffdf data.frame</i> |
|----------------|------------------------------------|

---

**Description**

Same functionality as `transform`, but on a `ffdf` object. Please note that you should write your expression as if it is a normal `data.frame`. The resulting `data.frame` however will be a `ffdf` `data.frame`.

**Usage**

```
## S3 method for class 'ffdf'
transform(`_data`, ...)
```

**Arguments**

`_data`            `ffdf` data object to be transformed.  
`...`            named arguments that will be added to the `ffdf` `data.frame`

**Value**

a modified clone of ``_data``.

**Examples**

```
transform(as.ffdf(airquality), Ozone = -Ozone)
transform(as.ffdf(airquality), new = -Ozone, Temp = (Temp-32)/1.8)
```

---

|           |  |
|-----------|--|
| unique.ff | <i>Unique values for ff and ffdf objects</i> |
|-----------|--|

---

**Description**

Unique values for `ff` and `ffdf` objects

**Usage**

```
## S3 method for class 'ff'
unique(x, incomparables = FALSE, fromLast = FALSE, trace = FALSE, ...)

## S3 method for class 'ffdf'
unique(x, incomparables = FALSE, fromLast = FALSE, trace = FALSE, ...)
```

**Arguments**

|               |  |
|---------------|--|
| x             | ff object or ffdof object  |
| incomparables | a vector of values that cannot be compared. FALSE is a special value, meaning that all values can be compared, and may be the only value accepted for methods other than the default. It will be coerced internally to the same type as x. |
| fromLast      | logical indicating if duplication should be considered from the last, i.e., the last (or rightmost) of identical elements will be kept   |
| trace         | logical indicating to show on which chunk the function is computing  |
| ...           | other parameters passed on to chunk  |

**Value**

An ffdof with unique values in x or an ff vector with unique values in x if x is a ff vector.

**See Also**

[unique](#)

**Examples**

```
data(iris)
irisdouble <- rbind(iris, iris)
ffiris <- as.ffdf(irisdouble)
## unique.ff
unique(ffiris$Sepal.Length)
unique(ffiris$Petal.Length)
ffiris$Species[1] <- NA
unique(ffiris$Species)
levels(unique(ffiris$Species))
## unique.ffdf
uiris <- unique(ffiris, trace=TRUE, by=10)[,]
test <- unique(irisdouble)
dim(iris)
dim(irisdouble)
dim(uiris)
dim(test)

!apply(uiris, MARGIN=1, FUN=function(x) paste(x, collapse=",")) %in%
  apply(test, MARGIN=1, FUN=function(x) paste(x, collapse=","))

!apply(test, MARGIN=1, FUN=function(x) paste(x, collapse=",")) %in%
  apply(uiris, MARGIN=1, FUN=function(x) paste(x, collapse=","))
```

---

|             |  |
|-------------|--|
| unpack.ffdf | <i>Unpacks previously stored ffd data.frame into a directory</i> |
|-------------|--|

---

### Description

unpack.ffdf restores ffd data.frames into the given dir, that were stored using [pack.ffdf](#). If dir is NULL (the default) the data.frames will be restored in a temporary directory.

### Usage

```
unpack.ffdf(file, dir = NULL, envir = parent.frame())
```

### Arguments

|       |  |
|-------|--|
| file  | packaged file, zipped or tar.gz.   |
| dir   | path where the data will be saved and all columns of supplied ffd's. It will be created if it doesn't exist. |
| envir | the environment where the stored variables should be loaded into.  |

### See Also

[load.ffdf](#) [pack.ffdf](#)

### Examples

```
iris.ffdf <- as.ffdf(iris)

td <- tempfile()

# save the ffd into the supplied directory
save.ffdf(iris.ffdf, dir=td)

# what in the directory?
dir(td)

#remove the ffd from memory
rm("iris.ffdf")

# and reload the stored ffd
load.ffdf(dir=td)

tf <- paste(tempfile(), ".zip", sep="")
packed <- pack.ffdf(file=tf, iris.ffdf)

#remove the ffd from memory
rm("iris.ffdf")

# restore the ffd from the packed ffd
unpack.ffdf(tf)
```

---

`with.ffdf`*Evaluate an expression in a ffdf data environment*

---

### Description

Evaluate an R expression in an environment constructed from a ffdf data frame. (see [with](#)). Please note that you should write your expression as if it is a normal `data.frame`. The resulting return value however will be a ff object.

### Usage

```
## S3 method for class 'ffdf'  
with(data, expr, ...)
```

### Arguments

|                   |   |
|-------------------|---|
| <code>data</code> | <a href="#">ffdf</a> data object used as an environment for evaluation. |
| <code>expr</code> | expression to evaluate.   |
| <code>...</code>  | arguments to be passed to <a href="#">chunk</a> .                       |

### Value

if expression is a vector a newly created ff vector will be returned otherwise if the expression is a `data.frame` a newly created ffdf object will be returned.

### Note

'with.ffdf' assumes that the returned object is of equal length as 'nrow(data)' and must be converted to a 'ff' object In case this is not true, the result won't be correct.

### See Also

[ffdfwith](#)

### Examples

```
dat <- data.frame(x=1:10, y=10:1)  
  
ffdat <- as.ffdf(dat)  
  
with(ffdat, {x+y})
```

---

|             |  |
|-------------|--|
| within.ffdf | <i>Evaluate an expression in a ffdf data environment</i> |
|-------------|--|

---

### Description

Same functionality as `within`. Please note that you should write your expression as if it is a normal `data.frame`. The resulting `data.frame` however will be a new `ffdf` `data.frame`.

### Usage

```
## S3 method for class 'ffdf'
within(data, expr, ...)
```

### Arguments

|                   |  |
|-------------------|--|
| <code>data</code> | <code>ffdf</code> data object used as an environment for evaluation. |
| <code>expr</code> | expression to evaluate.  |
| <code>...</code>  | arguments to be passed to <code>chunk</code> .                       |

### Value

a modified clone of `data`.

### Examples

```
ffdat <- as.ffdf(data.frame(x=1:10, y=10:1))
# add z to the ffdat
within(ffdat, {z <- x+y})
```

---

|                   |   |
|-------------------|---|
| <code>[.ff</code> | <i>Reading and writing vectors extended to handle logical ff vectors as indexes</i> |
|-------------------|---|

---

### Description

Package `ff` does not allow to extract and set values of `ff` vectors based on logical `ff` vectors. For this reason the extractor functions `[.ff` and `[<-.ff` defined in package `ff` are overloaded.

If you supply a logical `ff` vector as an index to another `ff` vector, the overloaded function will convert it to an integer `ff` index before using the `[.ff` and `[<-.ff` function from the `ff` package. This allows to do `ff(1:10)[ff(c(FALSE, TRUE, NA, TRUE))]`

Mark that all other functionality from the extractor functions `[.ff` and `[<-.ff` in package `ff` are retained. This is an extension to handle logical `ff` vectors as indexes.

**Usage**

```
## S3 method for class 'ff'
x[i, pack = FALSE]

## S3 replacement method for class 'ff'
x[i, add = FALSE, pack = FALSE] <- value
```

**Arguments**

|       |   |
|-------|---|
| x     | an ff object  |
| i     | missing OR a single index expression OR a <a href="#">hi</a> object   |
| pack  | FALSE to prevent rle-packing in hybrid index preprocessing, see <a href="#">as.hi</a>                               |
| add   | TRUE if the values should rather increment than overwrite at the target positions, see <a href="#">readwrite.ff</a> |
| value | the values to be assigned, possibly recycled  |

**Value**

See [Extract.ff](#). Mark that if a logical ff vector is used for i, and if only FALSE or NA values are present, NULL is returned in case of the extractor function [.ff while for the setter function [<-.ff, if the length value is zero, this is not allowed.

**See Also**

[Extract.ff](#)

**Examples**

```
## extractors
x <- ff(1:10)
y <- ff(11:20)
idx <- ff(c(FALSE, TRUE, NA, TRUE))
x[idx]
idx <- ff(c(FALSE, FALSE, TRUE))
x[idx]
idx <- ff(1:3)
x[idx]

## setters
idx <- ff(c(FALSE, TRUE, NA, TRUE))
x[idx] <- y[idx]
x
idx <- ff(c(FALSE, FALSE, TRUE))
try(x[idx] <- y[idx], silent = T) ## not allowed
x
idx <- ff(1:3)
x[idx] <- y[idx]
x
```

**Description**

Package `ff` does not allow to extract and set values of `ffdf` objects based on logical `ff` vectors. For this reason the extractor functions `[.ffdf` and `[<-.ffdf` defined in package `ff` are overloaded.

If you supply a logical `ff` vector as an index to subset an `ffdf` object, the overloaded function will convert the logical `ff` vector to an integer `ff` index before using the `[.ffdf` and `[<-.ffdf` functions from the `ff` package.

This allows to do `as.ffdf(iris)[as.ff(iris$Sepal.Length > 5),]`

This is an extension to handle logical `ff` vectors as indexes to `ffdf` objects.

**Usage**

```
## S3 method for class 'ffdf'
x[i, j, drop = TRUE]

## S3 replacement method for class 'ffdf'
x[i, j] <- value
```

**Arguments**

|                    |   |
|--------------------|---|
| <code>x</code>     | an <code>ff</code> object   |
| <code>i</code>     | a row subscript   |
| <code>j</code>     | a column subscript  |
| <code>drop</code>  | logical. If <code>TRUE</code> the result is coerced to the lowest possible dimension. |
| <code>value</code> | A suitable replacement value  |

**Value**

See [Extract.ffdf](#). Mark that if a logical `ff` vector is used for `i`, and if only `FALSE` or `NA` values are present, this is not allowed as `ffdf` with zero rows do not exist.

**See Also**

[Extract.ffdf](#)

**Examples**

```

## extractors for ffd objects
data(iris)
x <- as.ffdf(iris)
x[x$Sepal.Length > 5, ]
x[x$Sepal.Length > 5, 1:3]
x[x$Sepal.Length > 5, 1, drop=TRUE]
x[x$Sepal.Length > 5, 1]
x[, 1]
x[, ]
x[c("Sepal.Length", "Sepal.Width")]
x[1:2]

## setters
data(iris)
x <- as.ffdf(iris)
testpositions <- x$Sepal.Length > 5
testpositions <- ffwhich(testpositions, testpositions == TRUE)
mynewdata <- x[testpositions, c("Sepal.Length", "Sepal.Width")]
mynewdata$Sepal.Length <- ff(1, length = nrow(mynewdata))
x[x$Sepal.Length > 5, c("Sepal.Length", "Sepal.Width")] <- mynewdata
x[testpositions, ]

data(iris)
x <- as.ffdf(iris)
testpositions <- x$Sepal.Length > 5
testpositions <- ffwhich(testpositions, testpositions == TRUE)
mynewdata <- x[testpositions, c("Sepal.Length", "Sepal.Width")]
mynewdata$Sepal.Length <- ff(1, length = nrow(mynewdata))
x[testpositions, c("Sepal.Length", "Sepal.Width")] <- mynewdata
x[testpositions, ]

```



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