Package 'bignum'

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Title Arbitrary-Precision Integer and Floating-Point Mathematics

Version 0.2.2

Description Classes for storing and manipulating arbitrary-precision integer vectors and high-precision floating-point vectors. These extend the range and precision of the 'integer' and 'double' data types found in R. This package utilizes the 'Boost.Multiprecision' C++ library. It is specifically designed to work well with the 'tidyverse' collection of R packages.

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URL https://davidchall.github.io/bignum/, https://github.com/davidchall/bignum

BugReports https://github.com/davidchall/bignum/issues

Depends R (>= 3.3.0)

Imports rlang, vctrs (>= 0.3.0)

Suggests knitr, pillar (>= 1.6.0), rmarkdown, testthat

LinkingTo BH, cpp11

VignetteBuilder knitr

Config/testthat/edition 3

Encoding UTF-8

RoxygenNote 7.1.1

SystemRequirements C++11

NeedsCompilation yes

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R topics documented:

`bigfloat` *High-Precision Numeric Vectors*

Description

`bigfloat()` and `as_bigfloat()` construct a vector designed to store numbers with 50 decimal digits of precision.

`is_bigfloat()` checks if an object is of class `bignum_bigfloat`.

Usage

```
bigfloat(x = character())

as_bigfloat(x)

is_bigfloat(x)
```

Arguments

`x`	Object to be coerced or tested.

Value

An S3 vector of class `bignum_bigfloat`.

See Also

`NA_bigfloat_` to represent missing values.

`format()` for pretty printing.

`vignette("operations")` for supported operations.

Examples

```
# default options limit displayed precision
bigfloat(1) / 3

# display full precision
format(bigfloat(1) / 3, sigfig = 50, notation = "dec")
```

biginteger *Arbitrary-Precision Integer Vectors*

Description

`biginteger()` and `as_biginteger()` construct a vector designed to store *any* integer.

`is_biginteger()` checks if an object is of class `bignum_biginteger`.

Usage

```
biginteger(x = character())

as_biginteger(x)

is_biginteger(x)
```

Arguments

x	Object to be coerced or tested.

Value

An S3 vector of class `bignum_biginteger`.

See Also

`NA_biginteger_` to represent missing values.

`format()` for pretty printing.

`vignette("operations")` for supported operations.

Examples

```
# default options limit displayed precision
biginteger(2)^50L

# display full precision
format(biginteger(2)^50L, notation = "dec")

# lossy casts raise a warning
biginteger(c(2, 2.5, 3))

# suppress warnings if they are expected
vctrs::allow_lossy_cast(biginteger(c(2, 2.5, 3)))

# unsigned integers can be specified as hexadecimal
biginteger("0xffffffff")
```

bignum-constants *Constants*

Description

`NA_biginteger_` and `NA_bigfloat_` support missing values.

`bigpi` is a higher precision version of `pi`.

Usage

```
NA_biginteger_

NA_bigfloat_

bigpi
```

Value

A `biginteger` or `bigfloat` vector of length 1.

See Also

`NA` and `pi` are the base constants.

Examples

```
NA_biginteger_

NA_bigfloat_

# default options limit displayed precision
bigpi

# display full precision
format(bigpi, sigfig = 50, notation = "dec")
```

bignum-format *Format a bignum vector*

Description

Customize how a `biginteger` or `bigfloat` vector is displayed. The precision can be controlled with a number of significant figures, or with a maximum or fixed number of digits after the decimal point. You can also choose between decimal, scientific and hexadecimal notations.

The default formatting applied when printing depends on the type of object:

- **standalone vector:** consults `"bignum.sigfig"` and `"bignum.max_dec_width"`
- **tibble column:** consults `"pillar.sigfig"` and `"pillar.max_dec_width"`

Usage

```
## S3 method for class 'bignum_biginteger'
format(
  x,
  ...,
  sigfig = NULL,
  digits = NULL,
  notation = c("fit", "dec", "sci", "hex")
)

## S3 method for class 'bignum_bigfloat'
format(x, ..., sigfig = NULL, digits = NULL, notation = c("fit", "dec", "sci"))
```

Arguments

x	A biginteger or bigfloat vector.
...	These dots are for future extensions and must be empty.
sigfig	Number of significant figures to show. Must be positive. Cannot be combined with digits. If both sigfig and digits are unspecified, then consults the "bignum.sigfig" option (default: 7).
digits	Number of digits to show after the decimal point. Positive values indicate the exact number of digits to show. Negative values indicate the maximum number of digits to show (terminal zeros are hidden if there are no subsequent non-zero digits). Cannot be combined with sigfig.
notation	How should the vector be displayed? Choices: • "fit": Use decimal notation if it fits, otherwise use scientific notation. Consults the "bignum.max_dec_width" option (default: 13). • "dec": Use decimal notation, regardless of width. • "sci": Use scientific notation. • "hex": Use hexadecimal notation (positive biginteger only).

Value

Character vector

Examples

```
# default uses decimal notation
format(bigfloat(1e12))

# until it becomes too wide, then it uses scientific notation
format(bigfloat(1e13))

# hexadecimal notation is supported for positive integers
format(biginteger(255), notation = "hex")
```

```
# significant figures
format(bigfloat(12.5), sigfig = 2)

# fixed digits after decimal point
format(bigfloat(12.5), digits = 2)

# maximum digits after decimal point
format(bigfloat(12.5), digits = -2)
```

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