Package 'constants'

September 29, 2025

Type Package

Title Reference on Constants, Units and Uncertainty

Version 2022.0

Description CODATA internationally recommended values of the fundamental physical constants, provided as symbols for direct use within the R language. Optionally, the values with uncertainties and/or units are also provided if the 'errors', 'units' and/or 'quantities' packages are installed.
The Committee on Data for Science and Technology (CODATA) is an interdisciplinary committee of the International Council for Science which periodically provides the internationally accepted set of values of the fundamental physical constants. This package contains the ``2022 CODATA" version, published on May 2024:
Eite Tiesinga, Peter J. Mohr, David B. Newell, and Barry N. Taylor (2024) <https://physics.nist.gov/cuu/Constants/>.

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Encoding UTF-8

LazyData true

URL https://github.com/r-quantities/constants

BugReports https://github.com/r-quantities/constants/issues

Depends R (>= 3.5.0)

Suggests errors (>= 0.3.6), units, quantities, testthat

ByteCompile yes

RoxygenNote 7.3.3

NeedsCompilation no

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Repository CRAN

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Contents

`constants-package` **constants***: Reference on Constants, Units and Uncertainty*

Description

This package provides the 2022 version of the CODATA internationally recommended values of the fundamental physical constants for their use within the R language.

Author(s)

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References

Eite Tiesinga, Peter J. Mohr, David B. Newell, and Barry N. Taylor (2024). The 2022 CODATA Recommended Values of the Fundamental Physical Constants (Web Version 9.0). Database developed by J. Baker, M. Douma, and S. Kotochigova. Available at https://physics.nist.gov/cuu/Constants/, National Institute of Standards and Technology, Gaithersburg, MD 20899.

See Also

`codata`, `syms`, `lookup`.

`codata` *CODATA Recommended Values of the Fundamental Physical Constants: 2022*

Description

The Committee on Data for Science and Technology (CODATA) is an interdisciplinary committee of the International Council for Science. The Task Group on Fundamental Constants periodically provides the internationally accepted set of values of the fundamental physical constants. This dataset contains the "2022 CODATA" version, published on May 2024.

Usage

```
codata

codata.cor
```

Format

An object of class `data.frame` with the following information for each physical constant: ASCII `symbol`, `quantity` description, `type`, `value`, `uncertainty`, `unit`.

A `matrix` of correlations between physical constants.

Source

Eite Tiesinga, Peter J. Mohr, David B. Newell, and Barry N. Taylor (2024). The 2022 CODATA Recommended Values of the Fundamental Physical Constants (Web Version 9.0). Database developed by J. Baker, M. Douma, and S. Kotochigova. Available at https://physics.nist.gov/cuu/Constants/, National Institute of Standards and Technology, Gaithersburg, MD 20899.

See Also

`syms`, `lookup`.

`lookup` *Lookup for Fundamental Physical Constants*

Description

A simple wrapper around `grep` for exploring the CODATA dataset.

Usage

```
lookup(pattern, cols = c("symbol", "quantity", "type"), ...)
```

Arguments

`pattern`	character string containing a regular expression to be matched (see `grep`).
`cols`	columns to perform pattern matching (see `codata`).
`...`	additional arguments for `grep`.

See Also

`codata`, `syms`.

Examples

```
lookup("planck", ignore.case=TRUE)
```

`syms` *Lists of Constants*

Description

These named lists contain ready-to-use values for all the fundamental physical constants.

Usage

```
syms

syms_with_errors

syms_with_units

syms_with_quantities
```

Format

A `list`, where names correspond to symbols in `codata$symbol`.

- `syms` contains plain numeric values.
- `syms_with_errors` contains objects of type `errors`, which enables automatic uncertainty propagation.
- `syms_with_units` contains objects of type `units`, which enables automatic conversion, derivation and simplification.
- `syms_with_quantities` contains objects of type `quantities`, which combines `errors` and `units`.

The enriched versions of `syms` are available only if the corresponding optional packages, **errors**, **units** and/or **quantities** are installed. See the documentation of these packages for further information.

Details

Experimental support for correlations between constants is provided via the **errors** package, but it is disabled by default. To enable it, the following option must be set before loading the package:

```
options(constants.correlations=TRUE)
```

Alternatively, `constants:::set_correlations()` may be used interactively, but scripts should not rely on this non-exported function, as it may disappear in future versions.

See Also

`codata`, `lookup`.

Examples

```
# the speed of light
syms$c0
# use the constants in a local environment
with(syms, c0)

# attach only Planck-related constants
(lkp <- lookup("planck", ignore.case=TRUE))
idx <- as.integer(rownames(lkp))
attach(syms[idx])
h
plkl

# the same with uncertainty
detach(syms[idx])
attach(syms_with_errors[idx])
h
plkl

# the same with units
detach(syms_with_errors[idx])
attach(syms_with_units[idx])
h
plkl

# the same with everything
detach(syms_with_units[idx])
attach(syms_with_quantities[idx])
h
plkl
```

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