

# Package ‘rim’

May 6, 2022

**Type** Package

**Title** R's Interface to Maxima, Bringing Symbolic Computation into R

**Version** 0.5.1

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**Description**

Provides an interface to the powerful and fairly complete computer algebra system maxima. It can be used to start and control 'Maxima' from within R by entering 'Maxima' commands. It facilitates outputting results from 'Maxima' in 'LaTeX' and 'MathML'. 2D and 3D plots can be displayed directly. This package also registers a 'knitr'-engine enabling 'Maxima' code chunks to be written in 'RMarkdown' documents.

**URL** <https://rcst.github.io/rim/>

**BugReports** <https://github.com/rcst/rim/issues>

**SystemRequirements** Maxima (<https://sourceforge.net/projects/maxima/>, tested with versions  $\geq 5.42.1$ ), needs to be on PATH

**License** GPL ( $\geq 3$ )

**Imports** methods, Rcpp, R6, knitr, GlobalOptions

**LinkingTo** Rcpp

**RoxygenNote** 7.1.2

**Suggests** testthat ( $\geq 3.0.0$ ), digest, rmarkdown, OpenImageR

**Config/testthat/edition** 3

**Encoding** UTF-8

**NeedsCompilation** yes

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**Repository** CRAN

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rim-package	<i>rim</i>
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### Description

Provides an interface to Maxima, a computer algebra system.

### Usage

```
maxima.start(restart = FALSE)

maxima.stop()

maxima.get(command)

maxima.load(module)

maxima.apropos(keystring)

maxima.version()

maxima.isInstalled()

iprint(x)

## S3 method for class 'maxima'
print(x, ...)
```

### Arguments

restart	if FALSE (default), then Maxima is started provided it is not running already. If TRUE starts or restarts Maxima.
command	character string containing the Maxima command.
module	character vector naming the Maxima module (typically a *.mac or *.lisp file) to be loaded.
keystring	character vector containing a search term.
x	S3 object of class "maxima"
...	other arguments (ignored).

## Details

Note: You need to install the Maxima software separately in order to make use of this package.

Maxima is set up automatically on attachment via `library(rim)` and automatically started when a command is send (if it isn't running already) using `maxima.get()`. Using `maxima.start()` and `maxima.stop()`, one can stop and (re-)start the current Maxima session if needed, e.g. to clear Maxima command and output history.

To send a single command to Maxima and receive the corresponding output use `maxima.get()`. This function returns a S3 object of class "maxima". The output is printed by printing the object and will be printed in a format currently set by `maxima.options(format)`. The output format can be changed by setting it, e.g. `maxima.options(format = "ascii")`. Output labels are printed according to option `maxima.options(label)`.

## Value

`invisibly` returns NULL.

Character vector of length 1 of the input command. Depending on whether option "label" is set to TRUE, the corresponding input reference label is printed preceding the input command.

## Functions

- `maxima.start`: (re-)starts Maxima.
- `maxima.stop`: Quits Maxima.
- `maxima.get`: Executes a single Maxima command provided by `command`. If no command ending character (; or \$ is provided, ; is appended.
- `maxima.load`: A wrapper to load a Maxima module named by `module`
- `maxima.apropos`: A wrapper to the Maxima helper function `apropos` to lookup existing Maxima functions that match `keystring`.
- `maxima.version`: Returns the version number of Maxima that is used
- `maxima.isInstalled`: Returns TRUE when an installation of Maxima has been detected, otherwise FALSE
- `iprint`: Prints the input command of an maxima S3-object returned by `maxima.get()`
- `print.maxima`: Prints the maxima output part of an S3 object returned by `maxima.get()`

## Author(s)

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**See Also**

Useful links:

- <https://rcst.github.io/rim/>
- Report bugs at <https://github.com/rcst/rim/issues>

[maxima.engine](#), [maxima.options](#)

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maxima.engine	knitr <i>maxima engine</i>
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**Description**

Functions to process Maxima code chunks by knitr.

**Usage**

```
maxima.engine(options)
```

```
maxima.inline(command)
```

**Arguments**

options	named list of knitr options. Currently there are no maxima specific chunk options. To change the output format of the Maxima engine set the option <code>maxima.options(engine.format)</code> to either "linear" (default), "ascii", "latex" or "mathml".
command	character string containing the Maxima command to be executed.

**Details**

Upon attachment, i.e. `library(rim)` function `maxima.engine` is registered as a knitr engine. Thus, `maxima.engine()` is called by `knit()` to evaluate Maxima code chunks. When called upon the first code chunk of a document it starts Maxima in a separate process in server mode. This means that a single Maxima session is used for all Maxima code chunks of an RMarkdown document. Inputs and outputs can thus be used across chunks (e.g. by using Maxima reference labels). `maxima.options(engine.format = ..., engine.label = ...)` configures the output format and whether or not output reference labels should be printed.

The purpose of `maxima.inline` is to insert Maxima results as inline text, i.e. on the same line of the preceding text, if it is actually written on the same line of the RMarkdown file. It uses the same running Maxima process as `maxima.engine`. The output format for inline results can be configured separately from the settings of `maxima.engine`, i.e. `maxima.options(inline.format = ..., inline.label = ...)`.

**Value**

This function prints the resulting output from maxima together with its code character string containing the maxima result printed according options set by `maxima.options(inline.format = ..., inline.label = ...)`.

**Functions**

- `maxima.inline`: This function can be used to insert maxima outputs as inline.

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<code>maxima.options</code>	<i>maxima.options</i>
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**Description**

Function for globally setting and retrieving options.

**Usage**

```
maxima.options(
  ...,
  RESET = FALSE,
  READ.ONLY = NULL,
  LOCAL = FALSE,
  ADD = FALSE
)
```

**Arguments**

<code>...</code>	options to be accessed by using <code>name = value</code> . Options can be added by setting <code>ADD = TRUE</code> , but only those mentioned below will be used by rim.
<code>RESET</code>	logical of length 1, whether to reset all options to default values.
<code>READ.ONLY</code>	logical of length 1, can be used to output all options that are read-only.
<code>LOCAL</code>	logical of length 1, to output all options that are defined locally.
<code>ADD</code>	logical of length 1, whether to add the specified option in <code>...</code> ( <code>TRUE</code> ), default is <code>FALSE</code> .

**Details**

`format`: character vector of length 1 setting the output format for `maxima.get()`. Can be one of "linear", "ascii", "latex" or "mathml".

`engine.format`: same as option `format`, but for outputs in RMarkdown documents.

`inline.format`: character string setting the output format for `maxima.inline()`, for knitting outputs inline into RMarkdown documents. Can be one of "linear", "latex" or "mathml", but *not* "ascii".

`label`: logical of length 1, whether reference labels should be printed for returned S3 objects from `maxima.get()` (TRUE, default), or not (FALSE). This also applies to printing of input commands using `iprint()`.

`engine.label`: same as `label`, but for outputs in RMarkdown documents.

`inline.label`: same as `label`, but for inline outputs in RMarkdown documents.

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