The rmathbr package

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Contents

1 Introduction

Repeating of math operator at the broken line and the new line in inline equations is used in Cyrillic mathematical typography (Russian for example), but unfortunately, LaTeX doesn't provide such an option. There was an attempt to do it many years ago [see M.I. Grinchuk "TeX and Russian Traditions of Typesetting", TUGboat 17(4) (1996) 385], but there was no ready to use package.

This package extends ideas described in the "TeX and Russian Traditions of Typesetting" and supports most of LaTeX's mathematical packages (some known issues are listed in the "Known issues" section below).

2 Usage

Just include the package using `\usepackage{rmathbr}` command.

$$\begin{aligned}(a+b)^2 &= a^2 + \\ &+ 2ab + b^2, \\ a^2 - b^2 &= (a + \\ &+ b)(a - b),\end{aligned}\quad\left|\begin{aligned}a^3 &\pm b^3 = \\ &= (a \pm b) \times \\ &\times (a^2 \mp ab + b^2),\\ (1-x)^{-2} &= 1 + \end{aligned}\right.\quad\left|\begin{aligned}&+2x+3x^2+\ldots, \\ &\sin^2\alpha + \\ &+ \cos^2\alpha = 1, \\ &\int x \sin ax\, dx = \end{aligned}\right.\quad\left|\begin{aligned}&= a^{-2}(\sin ax - \\ &- ax\cos ax), \\ &t_1 t_2 \cos\theta = \vec{t_1}\cdot \end{aligned}\right.\quad\left|\begin{aligned}&\cdot \vec{t_2},\ x = 12\times \\ &\times 3 \cdot 10^3.\end{aligned}\right.$$

It's recommended to load rmathbr after other packages because rmathbr has special support of many math-related packages: amsfonts, amssymb, amstex, bm,

boisik, euler, eulervm, fourier, icomma, latexsym, lucbmath, lucidabr, lucmin, lucmtime, luctime, mathbbol, mathtools, mdwmath, program, sbbm, stmaryrd, unicode-math, wasysym, xy.

Please, submit any found bugs to https://github.com/dryabov/rmathbr/issues.

3 Options

Some aspects of the rmathbr can be altered using package options. In most cases, it should be sufficient to load the package without extra options, but sometimes it may be necessary to change default options for compatibility with other packages.

The "key=value" scheme is used with the following possible options (default value is printed in italics):

`script`	noactive *mathactive* active	This option declares what way rmathbr will affect `_` and `^` commands (sub- and superscripts). In the "noactive" mode, they have default TEX behavior, but it may be necessary to manually wrap some indices into curly braces, e.g. `A^{\star}` instead of just a `A^\star`. In the "mathactive" mode, both `_` and `^` become commands in math mode that process arguments properly, and extra wrapping is unnecessary. And in the "active" mode these commands can be used for scripts even in the text mode (e.g. `H_2O`).
`run`	atload atbegindocument *auto*	This option declares when to affect math commands for hyphenation, directly at package loading time, or later at the `\begin{document}`. The latter is necessary to deal with packages that declare math symbols at the `\begin{document}`. The "auto" value allows to switch to the "atbegindocument" mode automatically (currently, if unicode-math or mathtools packages are loaded).
`cdottimes`	true *false*	Re-declare `\cdot` command as `\cdott` (see `\cdott` description below) to hyphenate it using the `\times` character. By default, it is disabled because `\cdot` is also used for scalar products (e.g. $\vec{a} \cdot \vec{b}$), and in this case, it is wrong to replace it with `\times` on break, because `\times` is usually used for cross products.
`brokencolon`	true *false*	According to Russian typography traditions, math expression shouldn't be broken on the division character (`:`). But if you like to allow it, just set this option to true.

`brokenminus`	*true*	Usually, it's allowed to break math expression on the "minus" character, but it's possible to disable it.
	false	
`brokenbin`	true	This option disables breaks on binary operations (keeping relations only). See also `\BrokenBinOff` and `\BrokenBinOn` macros.
	false	

Internally, `scripts=mathactive` assigns the mathactive (12) category to `^` and `_` characters, `scripts=active` assigns the active (13) category, and `scripts=noactive` keeps default categories to `^` and `_` characters (7 and 8, correspondingly).

For backward compatibility, rmathbr supports the `noactivechars` option as an alias for `scripts=noactive`, the `mathactivechars` option as an alias for `scripts=mathactive`, and the `activechars` option as an alias for `scripts=active`. These options are deprecated, and it's recommended to switch to the corresponding `script` option.

4 Macros

`\*`

Macro `\*` is used to mark multiplication point that is invisible and changed to × at the break only. E.g. `(a+b)\*(a-b)`.

`\cdott`

This command displays `\cdot` (·) that is changed to `\times` (×) at the break.

`\nobr`

This command is used to prevent break expression on the following math operator. E.g. `a\nobr-b`.

`\SetBreakableRel`

Declares breakable relation operator, e.g. `\SetBreakableRel{\MyEqual}`.

`\SetBreakableBin`

Declares breakable binary operator, e.g. `\SetBreakableBin{\MyPlus}`.

`\SetBreakableInner`

Declares breakable "inner" expression, e.g. `\SetBreakableInner{\ldots}`.

`\SetOpenBracket`

Declares opening bracket (rmathbr disables break directly after brackets), e.g. `\SetOpenBracket{\MyOpenBracket}`.

`\SetMathOperator`

Declares math operator (rmathbr disables break directly after operators), e.g. `\SetMathOperator{\MySum}`.

`\SetPunctuation`

Declares punctuation command (rmathbr disables break directly after punctuation to prevent break and duplication in the case like `$1,-1$`), e.g. `\SetPunctuation{\MyColon}`.

`\UnsetBrokenCmd`

Restores original command, e.g. to avoid potential issues or conflicts with other packages. Usage example: `\UnsetBrokenCmd{\cdot}` to disable break on `\cdot`. Note that in the case of `run=atbegindocument` (or `auto`) this command should be used after `\begin{document}`.

`\BrokenBinOff`

Disables break on binary operations, see also `brokenbin=false` option.

`\BrokenBinOn`

Enables break on binary operations.

5 Known issues

- breqn package: cannot work together with rmathbr (as breqn redefines all the math in TEX)

6 Changelog

1.1.1 (18-December-2020)

- fix issue with a prime (') followed by a superscript
- fix issue with `\text` command as sub-/superscripts

1.1 (11-December-2020)

- add support of XeTeX/LuaTeX and unicode-math package
- add new key-value options (`script`, `run`, `cdottimes`, `brokenminus`, `brokencolon`, `brokenbin`)
- add new commands (`\UnsetBrokenCmd`, `\BrokenBinOff` and `\BrokenBinOn`)
- add support of mathtools package
- add a patch for bm package
- add a patch for xy package
- remove dependence on mathstyle package
- fix math class for =, <, > (`\mathrel` instead of `\mathbin`)
- fix math class for : (`\mathbin` instead of `\mathrel`)
- fix processing of colon-related commands (e.g. `\coloneq` from mathtools, etc.)
- performance optimizations

1.0.3 (10-April-2016)

- fix issue with sub-/superscripts in `\Biggl`, `\biggl`, `\Bigl`, `\bigl`

1.0.2 (23-June-2015)

- fix issue with expanding of math operators

1.0.1 (14-June-2015)

- fix `\cdott`-related issues (thanks to Bruno Le Floch)
- fix some `\SetBreakableRel` and `\SetBreakableBin` declarations
- fix mathematical operators with `\limits` or `\nolimits`

1.0 (02-June-2015)

- fix break after math operators (`\sum`, `\int`, etc.)
- add documentation

0.99 (15-November-2010)

- don't hyphenate trailing mathsign (e.g. in `$2+2=$`)
- don't change redefined symbols (`\le`, `\ge`, `\to`, etc.)

0.98 (31-January-2010)

- fix hyphenation on `:=`
- correct work with icomma package and option `[icomma]` of eulervm package
- correct work with program package
- symbols have been added from boisik, euler, fourier, lucbmath, lucidabr, lucmin, lucmtime, luctime, mathbbol, mdwmath, sbbm, stmaryrd, and wasysym packages.
- remove shrinking of space in math (breaked url package)
- don't hyphenate after punctuation ("`,`", "`;`", "`\colon`" etc.)
- create broken commands as robust ones
- some fixes of redeclaring of AMS commands
- commented hyphenation on `\ldots` and `\cdots`, as TEX doesn't break here

0.97 (08-October-2009)

- fix problem with operators like "`+^\leq`"

0.96 (29-September-2009)

- fix problem with "`-`" in AMS's `\DeclareMathOperator`
- fix problem with `\ldots` in text mode

0.95 (28-September-2009)

- fix problem with sub/sup-scripts after relations
- fix hyphenation on `\ldots`
- AMS/Lucida left brackets (`\lvert`, `\lVert`, `\ulcorner`, `\llcorner`) support
- mathbbol left bracket (`\Lbrack`) support
- huge code refactoring

0.91 (21-September-2009)

- fix problem with problem with space after brackets

0.90 (20-September-2009)

- first public release

7 Code

Initialization

Load required packages.

```
\RequirePackage{ifetex}
\RequirePackage{ifluatex}
\RequirePackage{xkeyval}
```

```
4 \RequirePackage{expl3}
```

\rmathbr@kv

```
5 \edef\rmathbr@kv{\@currname.\@currext}
```

\xDeclareBoolOptionX The macro to declare a boolean option.

```
6 \def\xDeclareBoolOptionX#1#2{%
7   \define@boolkey{\rmathbr@kv}[rmathbr@kv@]{#1}[true]{#2}%
8 }
```

\xDeclareChoiceOptionX The macro to declare a choice option.

```
9 \def\xDeclareChoiceOptionX#1[#2]#3[#4]#5{%
10   \define@choicekey{\rmathbr@kv}{#1}[#2]{#3}[#4]{#5}%
11 }
```

Warn about known issues.

```
12 \@ifpackageloaded{breqn}{%
13   \PackageError{rmathbr}{'rmathbr' package cannot be used together with 'breqn' package!}{}%
14 }{}
```

Interface

\nobr Makes next symbol nonbreakable.

```
15 \def\nobr{\penalty\relpenalty}
```

\SetBreakableRel Makes breakable relation sign.

```
16 \def\SetBreakableRel#1{\rmathbr@setbreakable{#1}{\brokenrel}}
```

\SetBreakableBin Makes breakable binary operation.

```
17 \def\SetBreakableBin#1{\rmathbr@setbreakable{#1}{\brokenbin}}
```

\SetBreakableInner Makes breakable inner (like \ldots).

```
18 \def\SetBreakableInner#1{\rmathbr@setbreakable{#1}{\brokeninner}}
```

\SetOpenBracket Disables breaks after open bracket.

```
19 \def\SetOpenBracket#1{\rmathbr@nobrafter{#1}}
```

\SetPunctuation Disables breaks after punctuation sign.

```
20 \def\SetPunctuation#1{\rmathbr@nobrafter{#1}}
```

\SetMathOperator Disables breaks after math operator.

```
21 \def\SetMathOperator#1{\rmathbr@setbreakable{#1}{\rmathbr@mathop}}
```

\UnsetBrokenCmd Restores original command.

```
22 \def\UnsetBrokenCmd#1{\rmathbr@unsetbroken{#1}}
```

\BrokenBinOff Disables break on binary operations.

```
23 \def\BrokenBinOff{\rmathbr@brokenbinoff}
```

\BrokenBinOn Enables break on binary operations.

```
24 \def\BrokenBinOn{\rmathbr@brokenbinon}
```

\brokenrel Makes argument as breakable relation sign.

```
\DeclareRobustCommand{\brokenrel}[1]{\rmathbr@brokenrel{#1}}
```

\brokenbin Makes argument as breakable binary operation.

```
\DeclareRobustCommand{\brokenbin}[1]{\rmathbr@brokenbin{#1}}
```

\brokeninner Makes argument as breakable inner.

```
\DeclareRobustCommand{\brokeninner}[1]{\rmathbr@brokeninner{#1}}
```

Options

Start to process options.

First of all, warn about deprecated options:

```
\xDeclareBoolOptionX{noactivechars}{
  \ifrmathbr@kv@noactivechars
    \PackageWarning{rmathbr}{^^J Option 'noactivechars' is deprecated.^^J
                             Use 'scripts=noactive' instead.^^J}
    \ExecuteOptionsX{scripts=noactive}
  \fi
}
\xDeclareBoolOptionX{mathactivechars}{
  \ifrmathbr@kv@mathactivechars
    \PackageWarning{rmathbr}{^^J Option 'mathactivechars' is deprecated.^^J
                             Use 'scripts=mathactive' instead.^^J}
    \ExecuteOptionsX{scripts=mathactive}
  \fi
}
\xDeclareBoolOptionX{activechars}{
  \ifrmathbr@kv@activechars
    \PackageWarning{rmathbr}{^^J Option 'activechars' is deprecated.^^J
                             Use 'scripts=active' instead.^^J}
    \ExecuteOptionsX{scripts=active}
  \fi
}
```

Process `script` option:

```
\xDeclareChoiceOptionX{scripts}[\xkv@val\xkv@nr]{noactive,mathactive,active}[mathactive]{
  \let\rmathbr@kv@scriptsmode=\xkv@nr
}
```

Set when to patch math commands, at the package loading or at the `\begin{document}` (i.e. after other packages are loaded and set its macros):

```
\newif\ifrmathbr@patch@begindocument
```

Note that by default 'atload' is used unless 'unicode-math' or 'mathtools' are loaded.

```
\xDeclareChoiceOptionX{run}[\xkv@val\xkv@nr]{atload,atbegindocument,auto}[auto]{
  \ifcase\xkv@nr\relax
    \rmathbr@patch@begindocumentfalse
  \or
    \rmathbr@patch@begindocumenttrue
  \or
    \@ifpackageloaded{unicode-math}{\rmathbr@patch@begindocumenttrue}{}
```

```
    \@ifpackageloaded{mathtools}{\rmathbr@patch@begindocumenttrue}{}
  \fi
}
```

The option to make `\cdot` works like `\cdott`:

```
\xDeclareBoolOptionX{cdottimes}{}
```

Other options (see documentation):

```
\xDeclareBoolOptionX{brokenminus}{}
\xDeclareBoolOptionX{brokencolon}{}
\xDeclareBoolOptionX{brokenbin}{%
  \ifrmathbr@kv@brokenbin
  \else
    \AtBeginDocument{\BrokenBinOff}
  \fi
}
```

Default values:

```
\ExecuteOptionsX{scripts=mathactive}
\ExecuteOptionsX{run=auto}
\ExecuteOptionsX{cdottimes=false}
\ExecuteOptionsX{brokenminus=true}
\ExecuteOptionsX{brokencolon=false}
\ExecuteOptionsX{brokenbin=true}
```

Execute options:

```
\ProcessOptionsX
```

Implementation

Switch to scripts mode

```
\ifcase\rmathbr@kv@scriptsmode
  % nop
\or
  \AtBeginDocument{\catcode`\^=12\mathcode`\^=32768\catcode`\_=12\mathcode`\_=32768}
\or
  \AtBeginDocument{\catcode`\^\active\catcode`\_\active}
\fi
```

`\rmathbr@pr@m@s` Fix the prime symbol to take into account active math superscripts.

```
\def\rmathbr@pr@m@s{%
  \ifx'\@let@token
    \let\rmathbr@command=\pr@@@s
  \else\ifx\rmathbr@superscript@std\@let@token
    \let\rmathbr@command=\pr@@@t
  \else\ifx\rmathbr@superscript@other\@let@token
    \let\rmathbr@command=\pr@@@t
  \else
    \let\rmathbr@command=\egroup
  \fi\fi\fi
  \rmathbr@command}

\ifnum\rmathbr@kv@scriptsmode>0\relax
  \let\pr@m@s=\rmathbr@pr@m@s
\fi
```

thbr@unicodemath@primes@patch Fix the prime symbol for unicode-math package.

__um_superscript:n

```
\ExplSyntaxOn
\def\rmathbr@unicodemath@primes@patch{
  \cs_gset:Nn \__um_superscript:n
    {
      \rmathbr@superscript@std\bgroup ##1
      \peek_meaning_remove:NTF \rmathbr@superscript@other \__um_arg_i_before_egroup:n {
        \peek_meaning_remove:NTF \rmathbr@superscript@std \__um_arg_i_before_egroup:n \egroup
      }
    }
}
\ExplSyntaxOff
```

Store original penalty values (via mathchardef trick).

```
\mathchardef\rmathbr@orig@relpenalty=\relpenalty
\mathchardef\rmathbr@orig@binoppenalty=\binoppenalty
```

Independent hyphen penalties are supported by LuaTeX only. That's why we save default penalty to `\exhyphenpenalty` (as `\exhyphenpenalty` will be actual penalty for math breaks in TEX and XeTeX).

```
\ifluatex\else
  \exhyphenpenalty=\relpenalty
\fi
```

Disable default breaks.

```
\relpenalty=13131
\binoppenalty=14141
```

\everymath First symbol/command in equation is nonbreakable.

```
\expandafter\everymath\expandafter{\the\everymath\nobr }
```

Save some characters definitions.

\rmathbr@superscript@std

```
\begingroup\catcode`\^=7 \global\let\rmathbr@superscript@std=^\endgroup
```

\rmathbr@superscript@other

```
\begingroup\catcode`\^=12\global\let\rmathbr@superscript@other=^\endgroup
```

\rmathbr@subscript@std

```
\begingroup\catcode`\_=8 \global\let\rmathbr@subscript@std=_\endgroup
```

\rmathbr@subscript@other

```
\begingroup\catcode`\_=12\global\let\rmathbr@subscript@other=_\endgroup
```

\rmathbr@prime

```
\begingroup\catcode`\'=12\global\let\rmathbr@prime='\endgroup
```

\rmathbr@superscript

```
\def\rmathbr@superscript{\rmathbr@check@arg\rmathbr@superscript@std}
```

\rmathbr@subscript

```
\def\rmathbr@subscript{\rmathbr@check@arg\rmathbr@subscript@std}
```

\rmathbr@check@arg Check that argument is rmathbr-processed command and wrap it into braces (if necessary)

```
\def\rmathbr@check@arg#1{%
  \let\rmathbr@checkarg@cmd=#1
  \futurelet\rmathbr@let@token\rmathbr@check@@arg%
}
```

\rmathbr@check@@arg

```
\def\rmathbr@check@@arg#1{%
  \let\rmathbr@command=\rmathbr@wrap@arg
  \ifx\rmathbr@let@token\bgroup\else
    \edef\rmathbr@orig{\expandafter\@gobble\string#1}
    \ifx\rmathbr@orig\empty\else
      \expandafter\ifx\csname rmathbr@orig@\rmathbr@orig\endcsname\relax
        \let\rmathbr@command=\@firstofone
      \fi
    \fi
  \fi
  \rmathbr@checkarg@cmd\rmathbr@command{#1}%
}
```

\rmathbr@wrap@arg

```
\def\rmathbr@wrap@arg#1{{#1}}
```

Setup sub- and superscripts.

```
\begingroup
  \catcode`\^\active\gdef^{\rmathbr@superscript}
  \catcode`\_\active\gdef_{\rmathbr@subscript}
\endgroup
```

```
\newif\ifrmathbr@activemathchar
```

Check for XeTeX/LuaTeX

```
\ifx\Umathcode\@undefined
```

Standard TeX

\rmathbr@checkmathchar

```
  \def\rmathbr@checkmathchar#1{%
    \ifnum\mathcode#1<32768\relax%
      \rmathbr@activemathcharfalse%
    \else%
      \rmathbr@activemathchartrue%
    \fi}
```

\rmathbr@mathchar

```
  \def\rmathbr@mathchar#1{\mathchar\number\mathcode#1}
```

\rmathbr@makeactivemathopen

```
  \def\rmathbr@makeactivemathopen#1{%
    \begingroup
      \xdef\@tempa{\mathopen\delimiter\number\delcode#1 \noexpand\nobr }
      \begingroup\lccode`~=#1\catcode#1\active\lowercase{\endgroup\xdef~}{\@tempa}
    \endgroup
```

```
  }
\else
```

XeTeX/LuaTeX

```
\rmathbr@activemathcode
  \begingroup
    \mathcode`\+="8000
    \xdef\rmathbr@activemathcode{\number\Umathcodenum`\+}
  \endgroup

\rmathbr@checkmathchar
  \def\rmathbr@checkmathchar#1{%
    \ifnum\Umathcodenum#1=\rmathbr@activemathcode\relax%
      \expandafter\rmathbr@activemathchartrue%
    \else%
      \expandafter\rmathbr@activemathcharfalse%
    \fi}

\rmathbr@mathchar
  \def\rmathbr@mathchar#1{\Umathcharnum\number\Umathcodenum#1}

\rmathbr@truncdiv
  \def\rmathbr@truncdiv#1#2{((#1-(#2-1)/2)/#2)}

\rmathbr@modulo
  \def\rmathbr@modulo#1#2{(#1-\rmathbr@truncdiv{#1}{#2}*#2)}

\rmathbr@makeactivemathopen
  \def\rmathbr@makeactivemathopen#1{%
    \begingroup
      \def\@tempa{\Udelcodenum#1}
      \ifnum\@tempa<"1000000
        \xdef\@tempb{\mathopen\delimiter\number\@tempa\space\noexpand\nobr }
      \else
        \xdef\@tempb{\mathopen\Udelimiter4 %
\number\numexpr\rmathbr@truncdiv{\rmathbr@modulo{\@tempa}{"40000000}}{"200000}\relax%
\space\number\numexpr\rmathbr@modulo{\@tempa}{"200000}\relax\noexpand\nobr }
      \fi
      \begingroup\lccode`~=#1\catcode#1\active\expandafter\lowercase\expandafter%
{\expandafter\endgroup\expandafter\gdef\expandafter~\expandafter}\expandafter{\@tempb}
    \endgroup

  }
\fi

\rmathbr@makeactivemath
\def\rmathbr@makeactivemath#1#2#3{
  \begingroup
    \rmathbr@checkmathchar{#1}
    \lccode`~=#1
    \catcode#1\active
    \ifrmathbr@activemathchar
      \PackageWarning{rmathbr}{Redeclare active math #1 symbol to default mathchar value}
```

```
198       \lowercase{\gdef~}{#2{#3}}
199     \else
200       \lowercase{\xdef~}{\noexpand#2{\rmathbr@mathchar{#1}}}
201     \fi
202   \endgroup
203 }
```

\rmathbr@makeactivemathpunct

```
204 \def\rmathbr@makeactivemathpunct#1#2{
205   \begingroup
206     \rmathbr@checkmathchar{#1}
207     \lccode`~=#1
208     \catcode#1\active
209     \ifrmathbr@activemathchar
210       \PackageWarning{rmathbr}{Redeclare active math #1 symbol to default mathchar value}
211       \lowercase{\gdef~}{\mathpunct#2\nobr }
212     \else
213       \lowercase{\xdef~}{\mathpunct\rmathbr@mathchar{#1} \noexpand\nobr }
214     \fi
215   \endgroup
216 }
```

```
217 \newif\ifrmathbr@protected
```

\rmathbr@str@contains

```
218 \def\rmathbr@str@contains#1#2{\begingroup\edef\x{\endgroup\noexpand\in@{#1}{#2}}\x}
```

\rmathbr@ifprotected

```
219 \def\rmathbr@ifprotected#1{%
220   \rmathbr@protectedfalse
221   \edef\meaning@cmd{\meaning#1}
222   \rmathbr@str@contains{\string#1\space}\meaning@cmd
223   \ifin@
224     \rmathbr@str@contains{\string\protect\space}\meaning@cmd
225     \ifin@\rmathbr@protectedtrue\else
226       \rmathbr@str@contains{\string\x@protect\space}\meaning@cmd
227       \ifin@\rmathbr@protectedtrue\else
228         \rmathbr@str@contains{\string\@testopt\space}\meaning@cmd
229         \ifin@\rmathbr@protectedtrue\else
230           \rmathbr@str@contains{\string\@protected@testopt\space}\meaning@cmd
231           \ifin@\rmathbr@protectedtrue\fi
232         \fi
233       \fi
234     \fi
235   \fi
236 }
```

mathbr@ReDeclareRobustCommand Command without arguments

```
237 \def\rmathbr@ReDeclareRobustCommand#1#2{%
238   \begingroup
239     \ifx#1\@undefined
240     \else
241       \edef\var@orig@I{rmathbr@orig@\expandafter\@gobble\string#1}
242       \edef\var@Ispace{\expandafter\@gobble\string#1 }
```

```
      \expandafter\ifx\csname\var@orig@I\endcsname\relax
        \ifetex
          \expandafter\global\expandafter\let\csname\var@orig@I\endcsname#1
        \else
          \rmathbr@ifprotected#1
          \ifrmathbr@protected
            \expandafter\global\expandafter\let\csname\var@orig@I\expandafter\endcsname%
\csname\var@Ispace\endcsname
          \else
            \expandafter\global\expandafter\let\csname\var@orig@I\endcsname#1
          \fi
        \fi
      \fi
      \ifetex
        \protected\gdef#1{#2}
      \else
        \expandafter\gdef\csname\var@Ispace\endcsname{#2}% no arguments
        \xdef#1{\noexpand\protect\expandafter\noexpand\csname\var@Ispace\endcsname}
      \fi
    \fi
  \endgroup%
}
```

athbr@ReDeclareRobustCommandI Command with one argument

```
\def\rmathbr@ReDeclareRobustCommandI#1#2{%
  \begingroup
    \ifx#1\@undefined
    \else
      \edef\var@orig@I{rmathbr@orig@\expandafter\@gobble\string#1}
      \edef\var@Ispace{\expandafter\@gobble\string#1\space}
      \expandafter\ifx\csname\var@orig@I\endcsname\relax
        \ifetex
          \expandafter\global\expandafter\let\csname\var@orig@I\endcsname#1
        \else
          \rmathbr@ifprotected#1
          \ifrmathbr@protected
            \expandafter\global\expandafter\let\csname\var@orig@I\expandafter\endcsname%
\csname\var@Ispace\endcsname
          \else
            \expandafter\global\expandafter\let\csname\var@orig@I\endcsname#1
          \fi
        \fi
      \fi
      \ifetex
        \protected\gdef#1##1{#2}
      \else
        \expandafter\gdef\csname\var@Ispace\endcsname##1{#2}% one argument
        \xdef#1{\noexpand\protect\expandafter\noexpand\csname\var@Ispace\endcsname}
      \fi
    \fi
  \endgroup%
}
```

\brokenrel

```
293 \rmathbr@ReDeclareRobustCommandI{\brokenrel}{\rmathbr@brokenrel{#1}}
```

\brokenbin

```
294 \rmathbr@ReDeclareRobustCommandI{\brokenbin}{\rmathbr@brokenbin{#1}}
```

\brokeninner

```
295 \rmathbr@ReDeclareRobustCommandI{\brokeninner}{\rmathbr@brokeninner{#1}}%
296 \let\rmathbr@save@brokenrel=\brokenrel
297 \let\rmathbr@save@brokenbin@on=\brokenbin
298 \let\rmathbr@save@brokenbin=\brokenbin
299 \let\rmathbr@save@brokeninner=\brokeninner
```

\rmathbr@brokenbinon

```
300 \def\rmathbr@brokenbinon{%
301   \let\rmathbr@save@brokenbin=\rmathbr@save@brokenbin@on
302   \ifx\brokenbin\@firstofone\else
303     \let\brokenbin=\rmathbr@save@brokenbin
304   \fi
305 }
```

\rmathbr@brokenbinoff

```
306 \def\rmathbr@brokenbinoff{%
307   \let\rmathbr@save@brokenbin=\mathbin
308   \ifx\brokenbin\@firstofone\else
309     \let\brokenbin=\rmathbr@save@brokenbin
310   \fi
311 }
```

\rmathbr@setbrokens

```
312 \def\rmathbr@setbrokens{%
313   \let\brokenrel=\rmathbr@save@brokenrel
314   \let\brokenbin=\rmathbr@save@brokenbin
315   \let\brokeninner=\rmathbr@save@brokeninner
316   \let\rmathbr@colontest=\rmathbr@save@colontest
317 }
```

\rmathbr@unsetbrokens

```
318 \def\rmathbr@unsetbrokens{%
319   \let\brokenrel=\@firstofone
320   \let\brokenbin=\@firstofone
321   \let\brokeninner=\@firstofone
322   \let\rmathbr@colontest=\rmathbr@colon@std
323 }
```

\rmathbr@brokenrel

```
324 \def\rmathbr@brokenrel#1{%
325   \def\rmathbr@arg{#1}
326   \let\rmathbr@this=\rmathbr@brokenrel
327   \let\rmathbr@output=\rmathbr@@brokenrel
328   \futurelet\rmathbr@let@token\rmathbr@brokenop%
329 }
```

\rmathbr@brokenbin

```
\def\rmathbr@brokenbin#1{%
  \def\rmathbr@arg{#1}
  \let\rmathbr@this=\rmathbr@brokenbin
  \let\rmathbr@output=\rmathbr@@brokenbin
  \futurelet\rmathbr@let@token\rmathbr@brokenop%
}
```

\rmathbr@brokeninner

```
\def\rmathbr@brokeninner#1{%
  \def\rmathbr@arg{#1}
  \let\rmathbr@this=\rmathbr@brokeninner
  \let\rmathbr@output=\rmathbr@@brokeninner
  \futurelet\rmathbr@let@token\rmathbr@brokenop%
}
```

\rmathbr@mathop

```
\def\rmathbr@mathop#1{%
  \def\rmathbr@arg{#1}
  \let\rmathbr@this=\rmathbr@mathop
  \let\rmathbr@output=\rmathbr@@mathop
  \futurelet\rmathbr@let@token\rmathbr@brokenop%
}
```

\rmathbr@@brokenrel LuaTeX only supports per-disc-node penalties

```
\def\rmathbr@@brokenrel#1{%
  \ifnum\lastpenalty=\relpenalty
    \mathrel{#1}
  \else
    \mathrel{#1}
    \ifx$\rmathbr@let@token
    \else
      \begingroup
        \hyphenpenalty\rmathbr@orig@relpenalty
        \rmathbr@selector{#1}
      \endgroup
    \fi
  \fi
  \rmathbr@setbrokens
  \penalty\relpenalty %
}
```

\rmathbr@@brokenbin

```
\def\rmathbr@@brokenbin#1{%
  \ifnum\lastpenalty=\relpenalty
    \mathbin{#1}
  \else
    \mathbin{#1}
    \ifx$\rmathbr@let@token
    \else
      \begingroup
        \hyphenpenalty\rmathbr@orig@binoppenalty
        \rmathbr@selector{#1}
```

```
      \endgroup
    \fi
  \fi
  \rmathbr@setbrokens
  \penalty\binoppenalty %
}
```

\rmathbr@@brokeninner

```
\def\rmathbr@@brokeninner#1{%
  \ifnum\lastpenalty=\relpenalty
    \mathinner{#1}
  \else
    \mathinner{#1}
    \ifx$\rmathbr@let@token
    \else
      \begingroup
        \hyphenpenalty\rmathbr@orig@relpenalty
        \rmathbr@selector{#1}
      \endgroup
    \fi
  \fi
  \rmathbr@setbrokens
  \penalty\relpenalty %
}
```

\rmathbr@@mathop

```
\def\rmathbr@@mathop#1{%
  \rmathbr@setbrokens
  #1\nobr %
}
```

\rmathbr@selector

```
\def\rmathbr@selector#1{%
  \mathchoice
    {\discretionary{}{\hbox{$\m@th\displaystyle#1$}}{}}
    {\discretionary{}{\hbox{$\m@th\textstyle#1$}}{}}
    {\discretionary{}{\hbox{$\m@th\scriptstyle#1$}}{}}
    {\discretionary{}{\hbox{$\m@th\scriptscriptstyle#1$}}{}}%
}
```

\rmathbr@brokenop

```
\def\rmathbr@brokenop{%
  \ifmmode
    \rmathbr@unsetbrokens
    \ifx\rmathbr@subscript@std\rmathbr@let@token
      \let\@command=\rmathbr@brokenglue
    \else\ifx\rmathbr@subscript@other\rmathbr@let@token
      \let\@command=\rmathbr@brokenglue
    \else\ifx\rmathbr@superscript@std\rmathbr@let@token
      \let\@command=\rmathbr@brokenglue
    \else\ifx\rmathbr@superscript@other\rmathbr@let@token
      \let\@command=\rmathbr@brokenglue
    \else\ifx\limits\rmathbr@let@token
      \let\@command=\rmathbr@brokenskip
```

```
    \else\ifx\nolimits\rmathbr@let@token
      \let\@command=\rmathbr@brokenskip
    \else\ifx\rmathbr@prime\rmathbr@let@token
      \let\@command=\rmathbr@brokenskip
    \else\ifx\relax\rmathbr@let@token
      \let\@command=\rmathbr@brokenskip
    \else
      \let\@command=\rmathbr@output
    \fi\fi\fi\fi\fi\fi\fi\fi
  \else
    \let\@command=\relax
  \fi
  \expandafter\@command\expandafter{\rmathbr@arg}%
}
```

\rmathbr@brokenglue

```
\def\rmathbr@brokenglue#1#2#3{%
  \def\rmathbr@temp{#1#2{#3}}
  \expandafter\rmathbr@this\expandafter{\rmathbr@temp}%
}
```

\rmathbr@brokenskip

```
\def\rmathbr@brokenskip#1#2{%
  \def\rmathbr@temp{#1#2}
  \expandafter\rmathbr@this\expandafter{\rmathbr@temp}%
}
```

\rmathbr@setbreakable

```
\def\rmathbr@setbreakable#1#2{%
  \begingroup
    \ifx#1\@undefined
    \else
      \edef\rmathbr@orig{rmathbr@orig@\expandafter\@gobble\string#1}
      \expandafter\ifx\csname\rmathbr@orig\endcsname\relax
        \expandafter\rmathbr@ReDeclareRobustCommand\expandafter#1\expandafter{%
\expandafter#2\expandafter{\csname\rmathbr@orig\endcsname}}
      \fi
    \fi
  \endgroup%
}
```

\rmathbr@nobrafter

```
\def\rmathbr@nobrafter#1{%
  \begingroup
    \ifx#1\@undefined
    \else
      \edef\rmathbr@orig{rmathbr@orig@\expandafter\@gobble\string#1}
      \expandafter\ifx\csname\rmathbr@orig\endcsname\relax
        \expandafter\rmathbr@ReDeclareRobustCommand\expandafter#1\expandafter{%
\csname\rmathbr@orig\endcsname\nobr}
      \fi
    \fi
  \endgroup%
}
```

\rmathbr@unsetbroken

```
\def\rmathbr@unsetbroken#1{
  \begingroup
    \ifx#1\@undefined
    \else
      \edef\rmathbr@orig{rmathbr@orig@\expandafter\@gobble\string#1}
      \expandafter\ifx\csname\rmathbr@orig\endcsname\relax
      \else
        \expandafter\global\expandafter\let\expandafter#1\csname\rmathbr@orig\endcsname
        \expandafter\global\expandafter\let\csname\rmathbr@orig\endcsname=\undefined
      \fi
    \fi
  \endgroup%
}
```

Redeclaration of math signs

\rmathbr@patch@commands

```
\def\rmathbr@patch@commands{%
```

Basic math.

=

```
\rmathbr@makeactivemath{`\=}{\brokenrel}{\mathchar12349}
```

<

```
\rmathbr@makeactivemath{`\<}{\brokenrel}{\mathchar12604}
```

>

```
\rmathbr@makeactivemath{`\>}{\brokenrel}{\mathchar12606}
```

+

```
\rmathbr@makeactivemath{`\+}{\brokenbin}{\mathchar8235}
```

-

```
\ifrmathbr@kv@brokenminus
  \rmathbr@makeactivemath{`\-}{\brokenbin}{\mathchar8704}
\fi
```

*

```
\rmathbr@makeactivemath{`\*}{\brokenbin}{\mathchar8707}
```

(

```
\rmathbr@makeactivemathopen{`\(}
```

[

```
\rmathbr@makeactivemathopen{`\[}
```

, Check for the icomma package and the eulervm package with icomma option.

```
\@ifpackageloaded{icomma}{%
  \expandafter\def\expandafter\sm@rtcomma\expandafter{\sm@rtcomma\nobr}
}{
```

```
  \ifx\domathcomma\@undefined%
    \rmathbr@makeactivemathpunct{‘\,}{\mathchar24891}
  \else%
    \expandafter\def\expandafter\domathcomma\expandafter{\domathcomma\nobr}
  \fi
}
```

; Check for the program package.

```
\@ifpackageloaded{program}{%
  \begingroup
    \catcode‘\;\active
    \lccode‘\~=‘\;%
    \lowercase{\gdef~}{\ifmmode\semicolon\;\nobr\else\@semicolon\fi}
  \endgroup
}{
  \rmathbr@makeactivemathpunct{‘\;}{\mathchar24635}
}
```

: Some extra code is necessary to distinguish between binary operation : and relation :=.

```
\begingroup%
  \catcode‘\:\active%
  \lccode‘\~=‘\:%
  \lowercase{\gdef~}{\rmathbr@colontest}%
\endgroup
```

\rmathbr@colontest Check for :=.

```
\def\rmathbr@colontest{\futurelet\rmathbr@let@token\rmathbr@do@colontest}
```

\rmathbr@do@colontest

```
\def\rmathbr@do@colontest{%
  \ifx=\rmathbr@let@token
    \expandafter\rmathbr@letsign
  \else
    \expandafter\rmathbr@colon
  \fi
}%

\rmathbr@checkmathchar{‘\:}

\ifrmathbr@activemathchar

  \PackageWarning{rmathbr}{Redeclare active math ‘\: symbol to default mathchar value}

  \def\rmathbr@colon@std{\mathchar12346}

  \ifrmathbr@kv@brokencolon
    \def\rmathbr@colon{\brokenbin{\rmathbr@colon@std}}
  \else
    \def\rmathbr@colon{\mathbin{\rmathbr@colon@std}}
  \fi

  \def\rmathbr@letsign##1{\brokenrel{\rmathbr@colon@std\mathchar12349}}

\else

  \edef\rmathbr@colon@std{\rmathbr@mathchar{‘\:}}
```

```
  \ifrmathbr@kv@brokencolon
    \def\rmathbr@colon{\brokenbin{\rmathbr@colon@std}}
  \else
    \def\rmathbr@colon{\mathbin{\rmathbr@colon@std}}
  \fi
  \edef\rmathbr@letsign##1{\noexpand\brokenrel{\rmathbr@colon@std\rmathbr@mathchar{‘\=}}}
\fi
\let\rmathbr@save@colontest=\rmathbr@colontest%
```

Support of unicode-math package

```
\@ifpackageloaded{unicode-math}{
  \begingroup
    \def\UnicodeMathSymbol##1##2##3##4{%
      \ifnum\number##1>127\relax
        \expandafter\let\expandafter\@char\Uchar\number##1\relax
        \ifx\@char##2\relax
          \let\cmd\relax
          \ifx##3\mathrel
            \def\cmd{\brokenrel}
          \else\ifx##3\mathbin
            \def\cmd{\brokenbin}
          \else\ifx##3\mathop
            \def\cmd{\rmathbr@mathop}
          \else\ifx##3\mathpunct
            \let\cmd=\nobr
          \fi\fi\fi\fi
          \ifx\cmd\relax\else
            \edef\var@orig@name{rmathbr@orig@\expandafter\@gobble\string##2}
            \expandafter\def\expandafter\var@orig\expandafter{\csname\var@orig@name\endcsname}
            \rmathbr@checkmathchar{\number##1}
            \ifrmathbr@activemathchar
              \begingroup
                \lccode‘~=\number##1
                \catcode\number##1\active
                \lowercase{\endgroup\expandafter\global\expandafter\let\var@orig~}
            \else
              \expandafter\xdef\var@orig{\rmathbr@mathchar{\number##1}}
              \global\mathcode\number##1="8000
            \fi
            \ifx\cmd\nobr
              \edef\@tempa{\expandafter\noexpand\var@orig\noexpand\nobr}
            \else
              \edef\@tempa{\expandafter\noexpand\cmd{\expandafter\noexpand\var@orig}}
            \fi
            \begingroup
              \lccode‘~=\number##1
              \catcode\number##1\active
              \lowercase{\endgroup\expandafter\gdef\expandafter~\expandafter}{\@tempa}
          \fi
        \fi
      \fi
    }
    \let\par=\relax
```

```
    \catcode`\"=12
    \@@input{unicode-math-table.tex}
  \endgroup
  \ifnum\rmathbr@kv@scriptsmode>0\relax
    \rmathbr@unicodemath@primes@patch
  \fi
}{}
```

\not Redeclare \not.

```
\rmathbr@ReDeclareRobustCommandI{\not}{%
  \begingroup
    \edef\rmathbr@orig{rmathbr@orig@\expandafter\@gobble\string##1}
    \expandafter\let\expandafter\rmathbr@origmacro\csname\rmathbr@orig\endcsname
    \ifx\rmathbr@origmacro##1\relax
      \begingroup
        \let##1=\rmathbr@origmacro
        \brokenrel{\rmathbr@orig@not##1}
      \endgroup
    \else
      \brokenrel{\rmathbr@orig@not##1}
    \fi
  \endgroup%
}
```

Open brackets.

```
\rmathbr@ReDeclareRobustCommandI{\bigl}{\rmathbr@mathop{\mathopen\big##1}}
\rmathbr@ReDeclareRobustCommandI{\Bigl}{\rmathbr@mathop{\mathopen\Big##1}}
\rmathbr@ReDeclareRobustCommandI{\biggl}{\rmathbr@mathop{\mathopen\bigg##1}}
\rmathbr@ReDeclareRobustCommandI{\Biggl}{\rmathbr@mathop{\mathopen\Bigg##1}}
\SetOpenBracket{\lmoustache}
\SetOpenBracket{\langle}
\SetOpenBracket{\lbrace}
\SetOpenBracket{\lceil}
\SetOpenBracket{\lfloor}
\SetOpenBracket{\lgroup}
\SetOpenBracket{\lvert}
\SetOpenBracket{\lVert}
\SetOpenBracket{\ulcorner}
\SetOpenBracket{\llcorner}
\SetOpenBracket{\Lbrack}
```

Math operators.

```
\SetMathOperator{\coprod}
\SetMathOperator{\bigvee}
\SetMathOperator{\bigwedge}
\SetMathOperator{\biguplus}
\SetMathOperator{\bigcap}
\SetMathOperator{\bigcup}
\SetMathOperator{\int}
\SetMathOperator{\prod}
\SetMathOperator{\sum}
\SetMathOperator{\bigotimes}
\SetMathOperator{\bigoplus}
\SetMathOperator{\bigodot}
```

```
\SetMathOperator{\oint}
\SetMathOperator{\bigsqcup}
\SetMathOperator{\smallint}
```

Punctuations.

```
\SetPunctuation{\ldotp}
\SetPunctuation{\cdotp}
\SetPunctuation{\colon}
\SetPunctuation{\period}
```

Binary Operations.

```
\SetBreakableBin{\triangleleft}
\SetBreakableBin{\triangleright}
\SetBreakableBin{\bigtriangleup}
\SetBreakableBin{\bigtriangledown}
\SetBreakableBin{\wedge} \SetBreakableBin{\land}
\SetBreakableBin{\vee}   \SetBreakableBin{\lor}
\SetBreakableBin{\cap}
\SetBreakableBin{\cup}
\SetBreakableBin{\ddagger}
\SetBreakableBin{\dagger}
\SetBreakableBin{\sqcap}
\SetBreakableBin{\sqcup}
\SetBreakableBin{\uplus}
\SetBreakableBin{\amalg}
\SetBreakableBin{\diamond}
\SetBreakableBin{\bullet}
\SetBreakableBin{\wr}
\SetBreakableBin{\div}
\SetBreakableBin{\odot}
\SetBreakableBin{\oslash}
\SetBreakableBin{\otimes}
\SetBreakableBin{\ominus}
\SetBreakableBin{\oplus}
\SetBreakableBin{\mp}
\SetBreakableBin{\pm}
\SetBreakableBin{\circ}
\SetBreakableBin{\bigcirc}
\SetBreakableBin{\setminus}
\SetBreakableBin{\ast}
\SetBreakableBin{\star}
\SetBreakableBin{\times}
\SetBreakableBin{\cdot}
```

`\rmathbr@cdott` `\cdott` is `\cdot` that is changed to `\times` at break point.

```
\def\rmathbr@cdott{%
  $\begingroup\hyphenpenalty\rmathbr@orig@binoppenalty\discretionary%
    {\hbox{$\m@th\rmathbr@orig@times$}}%
    {\hbox{$\m@th\rmathbr@orig@times$}}%
    {\hbox{$\m@th\mkern\medmuskip\rmathbr@orig@cdot\mkern\medmuskip$}}\endgroup$
}
```

`\cdott`

```
\def\cdott{%
  \ifmmode
```

```
    \ifetex
      \ifinner%
        \ifnum\currentgrouptype=15\relax
          \rmathbr@cdott
        \else
          \rmathbr@orig@cdot
        \fi
      \else
        \rmathbr@orig@cdot
      \fi
    \else
      \rmathbr@cdott
    \fi
  \else
    \rmathbr@orig@cdot
  \fi
}
```

\cdot

```
\ifrmathbr@kv@cdottimes
  \let\cdot\cdott
\fi
```

*

```
\def\*{\mathbin{}%
  \begingroup%
    \hyphenpenalty\rmathbr@orig@binoppenalty%
    \mathchoice{%
        \discretionary{\hbox{$\m@th\displaystyle\mkern\thinmuskip\times$}}%
{\hbox{$\m@th\displaystyle\times\mkern\thinmuskip$}}{}%
      }{%
        \discretionary{\hbox{$\m@th\textstyle\mkern\thinmuskip\times$}}%
{\hbox{$\m@th\textstyle\times\mkern\thinmuskip$}}{}%
      }{%
        \discretionary{\hbox{$\m@th\scriptstyle\mkern\thinmuskip\times$}}%
{\hbox{$\m@th\scriptstyle\times\mkern\thinmuskip$}}{}%
      }{%
        \discretionary{\hbox{$\m@th\scriptscriptstyle\mkern\thinmuskip\times$}}%
{\hbox{$\m@th\scriptscriptstyle\times\mkern\thinmuskip$}}{}%
      }%
  \endgroup%
  \penalty\binoppenalty%
}
```

Relations.

```
\SetBreakableRel{\propto}
\SetBreakableRel{\sqsubseteq}
\SetBreakableRel{\sqsupseteq}
\SetBreakableRel{\parallel}
\SetBreakableRel{\mid}
\SetBreakableRel{\dashv}
\SetBreakableRel{\vdash}
\SetBreakableRel{\leq} \SetBreakableRel{\le}
\SetBreakableRel{\geq} \SetBreakableRel{\ge}
```

```
\SetBreakableRel{\succ}
\SetBreakableRel{\prec}
\SetBreakableRel{\approx}
\SetBreakableRel{\succeq}
\SetBreakableRel{\preceq}
\SetBreakableRel{\supset}
\SetBreakableRel{\subset}
\SetBreakableRel{\supseteq}
\SetBreakableRel{\subseteq}
\SetBreakableRel{\in}
\SetBreakableRel{\ni} \SetBreakableRel{\owns}
\SetBreakableRel{\gg}
\SetBreakableRel{\ll}
\SetBreakableRel{\sim}
\SetBreakableRel{\simeq}
\SetBreakableRel{\perp}
\SetBreakableRel{\equiv}
\SetBreakableRel{\asymp}
\SetBreakableRel{\smile}
\SetBreakableRel{\frown}
\SetBreakableRel{\models}
\SetBreakableRel{\cong}
\SetBreakableRel{\notin}
\SetBreakableRel{\doteq}
\SetBreakableRel{\bowtie}
\SetBreakableRel{\neq} % Works well without \SetBreakableRel
\SetBreakableRel{\ne}  % Works well without \SetBreakableRel
```

Arrows.

```
\SetBreakableRel{\nearrow}
\SetBreakableRel{\searrow}
\SetBreakableRel{\nwarrow}
\SetBreakableRel{\swarrow}
\SetBreakableRel{\Leftrightarrow}
\SetBreakableRel{\Leftarrow}
\SetBreakableRel{\Rightarrow}
\SetBreakableRel{\leftrightarrow}
\SetBreakableRel{\leftarrow}  \SetBreakableRel{\gets}
\SetBreakableRel{\rightarrow} \SetBreakableRel{\to}
\SetBreakableRel{\leftharpoonup}
\SetBreakableRel{\leftharpoondown}
\SetBreakableRel{\rightharpoonup}
\SetBreakableRel{\rightharpoondown}
\SetBreakableRel{\longleftarrow}
\SetBreakableRel{\Longleftarrow}
\SetBreakableRel{\longrightarrow}
\SetBreakableRel{\Longrightarrow}
\SetBreakableRel{\longleftrightarrow}
\SetBreakableRel{\Longleftrightarrow}
\SetBreakableRel{\mapsto}
\SetBreakableRel{\longmapsto}
\SetBreakableRel{\hookleftarrow}
\SetBreakableRel{\hookrightarrow}
\SetBreakableRel{\rightleftharpoons}
```

Commands from latexsym.

```
\SetBreakableBin{\lhd}
\SetBreakableBin{\unlhd}
\SetBreakableBin{\rhd}
\SetBreakableBin{\unrhd}
\SetBreakableRel{\Join}
\SetBreakableRel{\leadsto}
\SetBreakableRel{\sqsubset}
\SetBreakableRel{\sqsupset}
```

Support amsfonts package

```
\@ifpackageloaded{amsfonts}{
  \SetBreakableRel{\dashrightarrow} \SetBreakableRel{\dasharrow}
  \SetBreakableRel{\dashleftarrow}
  \SetBreakableRel{\vartriangleright}
  \SetBreakableRel{\vartriangleleft}
  \SetBreakableRel{\trianglerighteq}
  \SetBreakableRel{\trianglelefteq}
  \SetBreakableRel{\rightsquigarrow} \SetBreakableRel{\leadsto}
}{}
```

Support amssymb package

```
\@ifpackageloaded{amssymb}{
  \SetBreakableBin{\boxdot}
  \SetBreakableBin{\boxplus}
  \SetBreakableBin{\boxtimes}
  \SetBreakableBin{\centerdot}
  \SetBreakableBin{\boxminus}
  \SetBreakableBin{\veebar}
  \SetBreakableBin{\barwedge}
  \SetBreakableBin{\doublebarwedge}
  \SetBreakableBin{\Cup} \SetBreakableBin{\doublecup}
  \SetBreakableBin{\Cap} \SetBreakableBin{\doublecap}
  \SetBreakableBin{\curlywedge}
  \SetBreakableBin{\curlyvee}
  \SetBreakableBin{\leftthreetimes}
  \SetBreakableBin{\rightthreetimes}
  \SetBreakableBin{\dotplus}
  \SetBreakableBin{\intercal}
  \SetBreakableBin{\circledcirc}
  \SetBreakableBin{\circledast}
  \SetBreakableBin{\circleddash}
  \SetBreakableBin{\divideontimes}
  \SetBreakableBin{\lessdot}
  \SetBreakableBin{\gtrdot}
  \SetBreakableBin{\ltimes}
  \SetBreakableBin{\rtimes}
  \SetBreakableBin{\smallsetminus}
  \SetBreakableRel{\circlearrowright}
  \SetBreakableRel{\circlearrowleft}
  \SetBreakableRel{\leftrightharpoons}
  \SetBreakableRel{\Vdash}
  \SetBreakableRel{\Vvdash}
  \SetBreakableRel{\vDash}
  \SetBreakableRel{\twoheadrightarrow}
```

```
\SetBreakableRel{\twoheadleftarrow}
\SetBreakableRel{\leftleftarrows}
\SetBreakableRel{\rightrightarrows}
\SetBreakableRel{\upuparrows}
\SetBreakableRel{\downdownarrows}
\SetBreakableRel{\upharpoonright} \SetBreakableRel{\restriction}
\SetBreakableRel{\downharpoonright}
\SetBreakableRel{\upharpoonleft}
\SetBreakableRel{\downharpoonleft}
\SetBreakableRel{\rightarrowtail}
\SetBreakableRel{\leftarrowtail}
\SetBreakableRel{\leftrightarrows}
\SetBreakableRel{\rightleftarrows}
\SetBreakableRel{\Lsh}
\SetBreakableRel{\Rsh}
\SetBreakableRel{\rightsquigarrow}
\SetBreakableRel{\leftrightsquigarrow}
\SetBreakableRel{\looparrowleft}
\SetBreakableRel{\looparrowright}
\SetBreakableRel{\circeq}
\SetBreakableRel{\succsim}
\SetBreakableRel{\gtrsim}
\SetBreakableRel{\gtrapprox}
\SetBreakableRel{\multimap}
\SetBreakableRel{\therefore}
\SetBreakableRel{\because}
\SetBreakableRel{\doteqdot} \SetBreakableRel{\Doteq}
\SetBreakableRel{\triangleq}
\SetBreakableRel{\precsim}
\SetBreakableRel{\lesssim}
\SetBreakableRel{\lessapprox}
\SetBreakableRel{\eqslantless}
\SetBreakableRel{\eqslantgtr}
\SetBreakableRel{\curlyeqprec}
\SetBreakableRel{\curlyeqsucc}
\SetBreakableRel{\preccurlyeq}
\SetBreakableRel{\leqq}
\SetBreakableRel{\leqslant}
\SetBreakableRel{\lessgtr}
\SetBreakableRel{\risingdotseq}
\SetBreakableRel{\fallingdotseq}
\SetBreakableRel{\succcurlyeq}
\SetBreakableRel{\geqq}
\SetBreakableRel{\geqslant}
\SetBreakableRel{\gtrless}
\SetBreakableRel{\vartriangleright}
\SetBreakableRel{\vartriangleleft}
\SetBreakableRel{\trianglerighteq}
\SetBreakableRel{\trianglelefteq}
\SetBreakableRel{\between}
\SetBreakableRel{\blacktriangleright}
\SetBreakableRel{\blacktriangleleft}
\SetBreakableRel{\vartriangle}
\SetBreakableRel{\eqcirc}
```

```
\SetBreakableRel{\lesseqgtr}
\SetBreakableRel{\gtreqless}
\SetBreakableRel{\lesseqqgtr}
\SetBreakableRel{\gtreqqless}
\SetBreakableRel{\Rrightarrow}
\SetBreakableRel{\Lleftarrow}
\SetBreakableRel{\varpropto}
\SetBreakableRel{\smallsmile}
\SetBreakableRel{\smallfrown}
\SetBreakableRel{\Subset}
\SetBreakableRel{\Supset}
\SetBreakableRel{\subseteqq}
\SetBreakableRel{\supseteqq}
\SetBreakableRel{\bumpeq}
\SetBreakableRel{\Bumpeq}
\SetBreakableRel{\lll} \SetBreakableRel{\llless}
\SetBreakableRel{\ggg} \SetBreakableRel{\gggtr}
\SetBreakableRel{\pitchfork}
\SetBreakableRel{\backsim}
\SetBreakableRel{\backsimeq}
\SetBreakableRel{\lvertneqq}
\SetBreakableRel{\gvertneqq}
\SetBreakableRel{\nleq}
\SetBreakableRel{\ngeq}
\SetBreakableRel{\nless}
\SetBreakableRel{\ngtr}
\SetBreakableRel{\nprec}
\SetBreakableRel{\nsucc}
\SetBreakableRel{\lneqq}
\SetBreakableRel{\gneqq}
\SetBreakableRel{\nleqslant}
\SetBreakableRel{\ngeqslant}
\SetBreakableRel{\lneq}
\SetBreakableRel{\gneq}
\SetBreakableRel{\npreceq}
\SetBreakableRel{\nsucceq}
\SetBreakableRel{\precnsim}
\SetBreakableRel{\succnsim}
\SetBreakableRel{\lnsim}
\SetBreakableRel{\gnsim}
\SetBreakableRel{\nleqq}
\SetBreakableRel{\ngeqq}
\SetBreakableRel{\precneqq}
\SetBreakableRel{\succneqq}
\SetBreakableRel{\precnapprox}
\SetBreakableRel{\succnapprox}
\SetBreakableRel{\lnapprox}
\SetBreakableRel{\gnapprox}
\SetBreakableRel{\nsim}
\SetBreakableRel{\ncong}
\SetBreakableRel{\varsubsetneq}
\SetBreakableRel{\varsupsetneq}
\SetBreakableRel{\nsubseteqq}
\SetBreakableRel{\nsupseteqq}
```

```
  \SetBreakableRel{\subsetneqq}
  \SetBreakableRel{\supsetneqq}
  \SetBreakableRel{\varsubsetneqq}
  \SetBreakableRel{\varsupsetneqq}
  \SetBreakableRel{\subsetneq}
  \SetBreakableRel{\supsetneq}
  \SetBreakableRel{\nsubseteq}
  \SetBreakableRel{\nsupseteq}
  \SetBreakableRel{\nparallel}
  \SetBreakableRel{\nmid}
  \SetBreakableRel{\nshortmid}
  \SetBreakableRel{\nshortparallel}
  \SetBreakableRel{\nvdash}
  \SetBreakableRel{\nVdash}
  \SetBreakableRel{\nvDash}
  \SetBreakableRel{\nVDash}
  \SetBreakableRel{\ntrianglerighteq}
  \SetBreakableRel{\ntrianglelefteq}
  \SetBreakableRel{\ntriangleleft}
  \SetBreakableRel{\ntriangleright}
  \SetBreakableRel{\nleftarrow}
  \SetBreakableRel{\nrightarrow}
  \SetBreakableRel{\nLeftarrow}
  \SetBreakableRel{\nRightarrow}
  \SetBreakableRel{\nLeftrightarrow}
  \SetBreakableRel{\nleftrightarrow}
  \SetBreakableRel{\eqsim}
  \SetBreakableRel{\shortmid}
  \SetBreakableRel{\shortparallel}
  \SetBreakableRel{\thicksim}
  \SetBreakableRel{\thickapprox}
  \SetBreakableRel{\approxeq}
  \SetBreakableRel{\succapprox}
  \SetBreakableRel{\precapprox}
  \SetBreakableRel{\curvearrowleft}
  \SetBreakableRel{\curvearrowright}
  \SetBreakableRel{\backepsilon}
}{}
```

Support amstex package

```
\@ifpackageloaded{amstex}{
  \SetBreakableRel{\vartriangleright} \SetBreakableRel{\rhd}
  \SetBreakableRel{\vartriangleleft}  \SetBreakableRel{\lhd}
  \SetBreakableRel{\trianglerighteq}  \SetBreakableRel{\unrhd}
  \SetBreakableRel{\trianglelefteq}   \SetBreakableRel{\unlhd}
  \SetBreakableRel{\rightsquigarrow}  \SetBreakableRel{\leadsto}
}{}
```

Support boisik package

```
\@ifpackageloaded{boisik}{
  \SetMathOperator{\intup}
  \SetOpenBracket{\binampersand}
  \SetBreakableRel{\upharpoonright}
  \SetBreakableRel{\downharpoonright}
  \SetBreakableRel{\upharpoonleft}
```

```
\SetBreakableRel{\downharpoonleft}
\SetBreakableRel{\leftrightarrows}
\SetBreakableRel{\rightleftarrows}
\SetBreakableRel{\leftrightharpoons}
\SetBreakableRel{\leftleftarrows}
\SetBreakableRel{\rightrightarrows}
\SetBreakableRel{\upuparrows}
\SetBreakableRel{\downdownarrows}
\SetBreakableRel{\twoheadrightarrow}
\SetBreakableRel{\twoheadleftarrow}
\SetBreakableRel{\rightarrowtail}
\SetBreakableRel{\leftarrowtail}
\SetBreakableRel{\rightsquigarrow}
\SetBreakableRel{\leftrightsquigarrow}
\SetBreakableRel{\Lsh}
\SetBreakableRel{\Rsh}
\SetBreakableRel{\looparrowleft}
\SetBreakableRel{\looparrowright}
\SetBreakableRel{\circlearrowright}
\SetBreakableRel{\circlearrowleft}
\SetBreakableRel{\curvearrowleft}
\SetBreakableRel{\curvearrowright}
\SetBreakableRel{\nleftarrow}
\SetBreakableRel{\nrightarrow}
\SetBreakableRel{\nleftrightarrow}
\SetBreakableRel{\nLeftarrow}
\SetBreakableRel{\nRightarrow}
\SetBreakableRel{\nLeftrightarrow}
\SetBreakableRel{\Lleftarrow}
\SetBreakableRel{\Rrightarrow}
\SetBreakableRel{\nLeftrightarroW}
% \SetBreakableRel{\lhook}
% \SetBreakableRel{\rhook}
\SetBreakableRel{\multimap}
\SetBreakableRel{\multimapdot}
\SetBreakableRel{\therefore}
\SetBreakableRel{\because}
\SetBreakableRel{\between}
\SetBreakableRel{\Vdash}
\SetBreakableRel{\Vvdash}
\SetBreakableRel{\VDash}
\SetBreakableRel{\vDash}
\SetBreakableRel{\smallsmile}
\SetBreakableRel{\smallfrown}
\SetBreakableRel{\shortmid}
\SetBreakableRel{\shortparallel}
\SetBreakableRel{\thickapprox}
\SetBreakableBin{\divideontimes}
\SetBreakableBin{\lessdot}
\SetBreakableBin{\gtrdot}
\SetBreakableRel{\bumpeq}
\SetBreakableRel{\Bumpeq}
\SetBreakableRel{\leqslant}
\SetBreakableRel{\geqslant}
```

```
\SetBreakableRel{\eqslantless}
\SetBreakableRel{\eqslantgtr}
\SetBreakableRel{\curlyeqprec}
\SetBreakableRel{\curlyeqsucc}
\SetBreakableRel{\preccurlyeq}
\SetBreakableRel{\succcurlyeq}
\SetBreakableRel{\thicksim}
\SetBreakableRel{\backsim}
\SetBreakableRel{\eqsim}
\SetBreakableRel{\backsimeq}
\SetBreakableBin{\ltimes}
\SetBreakableBin{\rtimes}
\SetBreakableRel{\lll} \SetBreakableRel{\llless}
\SetBreakableRel{\ggg} \SetBreakableRel{\gggtr}
\SetBreakableRel{\trianglеq}
\SetBreakableRel{\circeq}
\SetBreakableRel{\eqcirc}
\SetBreakableRel{\doteqdot} \SetBreakableRel{\Doteq}
\SetBreakableRel{\risingdotseq}
\SetBreakableRel{\fallingdotseq}
\SetBreakableRel{\varpropto}
\SetBreakableRel{\vartriangleright}
\SetBreakableRel{\vartriangleleft}
\SetBreakableRel{\trianglerighteq}
\SetBreakableRel{\trianglelefteq}
\SetBreakableRel{\blacktriangleright}
\SetBreakableRel{\blacktriangleleft}
\SetBreakableRel{\vartriangle}
\SetBreakableBin{\centerdot}
\SetBreakableBin{\boxplus}
\SetBreakableBin{\boxminus}
\SetBreakableBin{\boxtimes}
\SetBreakableBin{\boxdot}
\SetBreakableBin{\circledcirc}
\SetBreakableBin{\circledast}
\SetBreakableBin{\circleddash}
\SetBreakableBin{\intercal}
\SetBreakableRel{\prurel}
\SetBreakableRel{\scurel}
\SetBreakableRel{\disin}
\SetBreakableRel{\nisd}
\SetBreakableRel{\fatslash}
\SetBreakableRel{\fatbslash}
\SetBreakableRel{\nequiv}
\SetBreakableRel{\bagmember}
\SetBreakableRel{\lvertneqq}
\SetBreakableRel{\gvertneqq}
\SetBreakableRel{\nleq}
\SetBreakableRel{\ngeq}
\SetBreakableRel{\nless}
\SetBreakableRel{\ngtr}
\SetBreakableRel{\nprec}
\SetBreakableRel{\nsucc}
\SetBreakableRel{\lneqq}
```

```
\SetBreakableRel{\gneqq}
\SetBreakableRel{\nleqslant}
\SetBreakableRel{\ngeqslant}
\SetBreakableRel{\lneq}
\SetBreakableRel{\gneq}
\SetBreakableRel{\npreceq}
\SetBreakableRel{\nsucceq}
\SetBreakableRel{\nleqq}
\SetBreakableRel{\ngeqq}
\SetBreakableRel{\lnsim}
\SetBreakableRel{\gnsim}
\SetBreakableRel{\precnsim}
\SetBreakableRel{\succnsim}
\SetBreakableRel{\precneqq}
\SetBreakableRel{\succneqq}
\SetBreakableRel{\nsim}
\SetBreakableRel{\ncong}
\SetBreakableRel{\lnapprox}
\SetBreakableRel{\gnapprox}
\SetBreakableRel{\precnapprox}
\SetBreakableRel{\succnapprox}
\SetBreakableRel{\nsubset}
\SetBreakableRel{\nsupset}
\SetBreakableRel{\varsubsetneq}
\SetBreakableRel{\varsupsetneq}
\SetBreakableRel{\nsubseteqq}
\SetBreakableRel{\nsupseteqq}
\SetBreakableRel{\subsetneqq}
\SetBreakableRel{\supsetneqq}
\SetBreakableRel{\varsubsetneqq}
\SetBreakableRel{\varsupsetneqq}
\SetBreakableRel{\subsetneq}
\SetBreakableRel{\supsetneq}
\SetBreakableRel{\nsubseteq}
\SetBreakableRel{\nsupseteq}
\SetBreakableRel{\nparallel}
\SetBreakableRel{\nmid}
\SetBreakableRel{\nshortmid}
\SetBreakableRel{\nshortparallel}
\SetBreakableRel{\nvdash}
\SetBreakableRel{\nVdash}
\SetBreakableRel{\nvDash}
\SetBreakableRel{\nVDash}
\SetBreakableRel{\ntrianglerighteq}
\SetBreakableRel{\ntrianglelefteq}
\SetBreakableRel{\ntriangleleft}
\SetBreakableRel{\ntriangleright}
\SetBreakableRel{\precapprox}
\SetBreakableRel{\succapprox}
\SetBreakableRel{\precsim}
\SetBreakableRel{\succsim}
\SetBreakableRel{\lesssim}
\SetBreakableRel{\gtrsim}
\SetBreakableRel{\lessapprox}
```

```
\SetBreakableRel{\gtrapprox}
\SetBreakableRel{\leqq}
\SetBreakableRel{\geqq}
\SetBreakableRel{\lessgtr}
\SetBreakableRel{\gtrless}
\SetBreakableRel{\lesseqgtr}
\SetBreakableRel{\gtreqless}
\SetBreakableRel{\lesseqqgtr}
\SetBreakableRel{\gtreqqless}
\SetBreakableRel{\Subset}
\SetBreakableRel{\Supset}
\SetBreakableBin{\Cup} \SetBreakableBin{\doublecup}
\SetBreakableBin{\Cap} \SetBreakableBin{\doublecap}
\SetBreakableRel{\subseteqq}
\SetBreakableRel{\supseteqq}
\SetBreakableBin{\curlywedge}
\SetBreakableBin{\curlyvee}
\SetBreakableBin{\veebar}
\SetBreakableBin{\barwedge}
\SetBreakableBin{\doublebarwedge}
\SetBreakableBin{\leftthreetimes}
\SetBreakableBin{\rightthreetimes}
\SetBreakableBin{\smallsetminus}
\SetBreakableRel{\approxeq}
\SetBreakableBin{\dotplus}
\SetBreakableRel{\pitchfork}
\SetBreakableBin{\oblong}
\SetBreakableBin{\talloblong}
\SetBreakableBin{\sslash}
\SetBreakableBin{\bbslash}
\SetBreakableRel{\hash}
\SetBreakableRel{\varhash}
\SetBreakableBin{\convolution}
\SetBreakableBin{\coAsterisk}
\SetBreakableRel{\veeeq}
\SetBreakableRel{\corresponds}
\SetBreakableRel{\arceq}
\SetBreakableRel{\CircledEq}
\SetBreakableRel{\eqbumped}
\SetBreakableRel{\dotminus}
\SetBreakableRel{\kernelcontraction}
\SetBreakableRel{\dotsim}
\SetBreakableRel{\simrdots}
\SetBreakableBin{\circplus}
\SetBreakableBin{\dottimes}
\SetBreakableBin{\vartimes}
\SetBreakableBin{\merge}
\SetBreakableBin{\veeonvee}
\SetBreakableBin{\obslash}
\SetBreakableBin{\otop}
\SetBreakableBin{\obot}
\SetBreakableBin{\oleft}
\SetBreakableBin{\oright}
\SetBreakableBin{\obar}
```

```
\SetBreakableBin{\otriangle}
\SetBreakableBin{\olessthan}
\SetBreakableBin{\ogreaterthan}
\SetBreakableBin{\ovee}
\SetBreakableBin{\owedge}
\SetBreakableBin{\boxbslash}
\SetBreakableBin{\boxtop}
\SetBreakableBin{\boxbot}
\SetBreakableBin{\boxleft}
\SetBreakableBin{\boxright}
\SetBreakableBin{\boxbar}
\SetBreakableBin{\boxslash}
\SetBreakableBin{\boxtriangle}
\SetBreakableBin{\boxast}
\SetBreakableBin{\boxcircle}
\SetBreakableBin{\boxdivision}
\SetBreakableBin{\boxbox}
\SetBreakableBin{\diamondop}
\SetBreakableBin{\diamondminus}
\SetBreakableBin{\diamondbar}
\SetBreakableBin{\diamondtimes}
\SetBreakableBin{\diamondplus}
\SetBreakableBin{\diamondtriangle}
\SetBreakableBin{\diamondcircle}
\SetBreakableBin{\cupleftarrow}
\SetBreakableBin{\varcup}
\SetBreakableBin{\varcap}
\SetBreakableBin{\varsqcup}
\SetBreakableBin{\varsqcap}
\SetBreakableRel{\sqSubset}
\SetBreakableRel{\sqSupset}
\SetBreakableRel{\inplus}
\SetBreakableRel{\niplus}
\SetBreakableRel{\varisins}
\SetBreakableRel{\varnis}
\SetBreakableRel{\subsetplus}
\SetBreakableRel{\supsetplus}
\SetBreakableRel{\subsetpluseq}
\SetBreakableRel{\supsetpluseq}
\SetBreakableBin{\nplus}
\SetBreakableBin{\squplus}
\SetBreakableRel{\multimapboth}
\SetBreakableRel{\multimapdotboth}
\SetBreakableRel{\multimapdotbothB}
\SetBreakableRel{\multimapdotbothA}
\SetBreakableRel{\multimapinv}
\SetBreakableRel{\multimapdotinv}
\SetBreakableRel{\multimapbothvert}
\SetBreakableRel{\multimapdotbothvert}
\SetBreakableRel{\multimapdotbothBvert}
\SetBreakableRel{\multimapdotbothAvert}
\SetBreakableRel{\dfourier}
\SetBreakableRel{\Dfourier}
\SetBreakableRel{\ztransf}
```

```
\SetBreakableRel{\Ztransf}
\SetBreakableRel{\Lt}
\SetBreakableRel{\Gt}
\SetBreakableBin{\leftslice}
\SetBreakableBin{\rightslice}
\SetBreakableRel{\trianglelefteqslant}
\SetBreakableRel{\trianglerighteqslant}
\SetBreakableBin{\Ydown}
\SetBreakableBin{\Yup}
\SetBreakableBin{\Yleft}
\SetBreakableBin{\Yright}
\SetBreakableRel{\dashVv}
\SetBreakableRel{\DashV}
\SetBreakableRel{\DashV}
\SetBreakableRel{\dashV}
\SetBreakableBin{\lbag}
\SetBreakableBin{\rbag}
\SetBreakableRel{\Perp}
\SetBreakableBin{\moo}
\SetBreakableBin{\baro}
\SetBreakableBin{\pluscirc}
\SetBreakableBin{\minuso}
\SetBreakableRel{\llcurly}
\SetBreakableRel{\ggcurly}
\SetBreakableRel{\strictfi}
\SetBreakableRel{\strictif}
\SetBreakableRel{\ac}
\SetBreakableBin{\varintercal}
\SetBreakableRel{\equalparallel}
\SetBreakableBin{\plustrif}
\SetBreakableBin{\smashtimes}
\SetBreakableRel{\ltcir}
\SetBreakableRel{\gtcir}
\SetBreakableRel{\glj}
\SetBreakableBin{\Vee}
\SetBreakableBin{\Wedge}
\SetBreakableBin{\fatsemi}
\SetBreakableRel{\forkv}
\SetBreakableRel{\topfork}
\SetBreakableRel{\twoheaduparrow}
\SetBreakableRel{\twoheaddownarrow}
\SetBreakableRel{\mapsfrom}
\SetBreakableRel{\mapsup}
\SetBreakableRel{\mapsdown}
\SetBreakableRel{\nVleftarrow}
\SetBreakableRel{\nVrightarrow}
\SetBreakableRel{\rightarrowcircle}
\SetBreakableRel{\nwarrowcorner}
\SetBreakableRel{\nearrowcorner}
\SetBreakableRel{\barovernorthwestarrow}
\SetBreakableRel{\carriagereturn}
\SetBreakableRel{\linefeed}
\SetBreakableRel{\leftzigzagarrow}
\SetBreakableRel{\Nwarrow}
```

```
\SetBreakableRel{\Nearrow}
\SetBreakableRel{\Swarrow}
\SetBreakableRel{\Searrow}
\SetBreakableRel{\nHuparrow}
\SetBreakableRel{\nHdownarrow}
\SetBreakableRel{\updownarrowbar}
\SetBreakableRel{\barleftarrow}
\SetBreakableRel{\rightarrowbar}
\SetBreakableRel{\leftsquigarrow}
\SetBreakableRel{\rightsquigarrow}
\SetBreakableRel{\leftrightsquigarrow}
\SetBreakableRel{\downzigzagarrow}
\SetBreakableRel{\rightthreearrows}
\SetBreakableRel{\barleftarrowrightarrowbar}
\SetBreakableRel{\leftdasharrow}
\SetBreakableRel{\rightdasharrow}
\SetBreakableRel{\updasharrow}
\SetBreakableRel{\downdasharrow}
\SetBreakableRel{\upwhitearrow}
\SetBreakableRel{\downwhitearrow}
\SetBreakableRel{\whitearrowupfrombar}
\SetBreakableRel{\whitearrowuppedestal}
\SetBreakableRel{\whitearrowuppedestalhbar}
\SetBreakableRel{\whitearrowuppedestalvbar}
\SetBreakableRel{\twoheadwhiteuparrow}
\SetBreakableRel{\twoheadwhiteuparrowpedestal}
\SetBreakableRel{\updownwhitearrow}
\SetBreakableRel{\leftblackarrow}
\SetBreakableRel{\rightblackarrow}
\SetBreakableRel{\upblackarrow}
\SetBreakableRel{\downblackarrow}
\SetBreakableRel{\leftrightblackarrow}
\SetBreakableRel{\updownblackarrow}
\SetBreakableRel{\curlyveeuparrow}
\SetBreakableRel{\curlyveedownarrow}
\SetBreakableRel{\curlywedgeuparrow}
\SetBreakableRel{\curlywedgedownarrow}
\SetBreakableRel{\Mapsfrom}
\SetBreakableRel{\Mapsto}
\SetBreakableRel{\leftwhitearrow}
\SetBreakableRel{\rightwhitearrow}
\SetBreakableRel{\leftwhiteroundarrow}
\SetBreakableRel{\rightwhiteroundarrow}
\SetBreakableRel{\righttoleftarrow}
\SetBreakableRel{\lefttorightarrow}
\SetBreakableRel{\looparrowdownleft}
\SetBreakableRel{\looparrowdownright}
\SetBreakableRel{\uptodownarrow}
\SetBreakableRel{\downtouparrow}
\SetBreakableRel{\nnearrow}
\SetBreakableRel{\ssearrow}
\SetBreakableRel{\nnwarrow}
\SetBreakableRel{\sswarrow}
\SetBreakableRel{\curvearrowleft}
```

```
  \SetBreakableRel{\curvearrowright}
  \SetBreakableRel{\curvearrowleftright}
  \SetBreakableRel{\curvearrowbotleft}
  \SetBreakableRel{\curvearrowbotright}
  \SetBreakableRel{\curvearrowbotleftright}
  \SetBreakableRel{\leftrightarroweq}
  \SetBreakableRel{\eqleftrightarrow}
  \SetBreakableRel{\dlsh}
  \SetBreakableRel{\drsh}
  \SetBreakableRel{\leftarrowTriangle}
  \SetBreakableRel{\rightarrowTriangle}
  \SetBreakableRel{\leftrightarrowTriangle}
  \SetBreakableRel{\leftarrowtriangle}
  \SetBreakableRel{\rightarrowtriangle}
  \SetBreakableRel{\leftrightarrowtriangle}
}{}
```

Support euler package

```
\@ifpackageloaded{euler}{% euler
  \SetBreakableRel{\uparrow}
  \SetBreakableRel{\downarrow}
  \SetBreakableRel{\updownarrow}
  \SetBreakableRel{\Uparrow}
  \SetBreakableRel{\Downarrow}
  \SetBreakableRel{\Updownarrow}
  % \SetBreakableRel{\lhook}
  % \SetBreakableRel{\rhook}
}{}
```

Support fourier package

```
\@ifpackageloaded{fourier}{
  \SetMathOperator{\iint}
  \SetMathOperator{\iiint}
  \SetMathOperator{\oiint}
  \SetMathOperator{\oiiint}
  \SetMathOperator{\slashint}
  \SetOpenBracket{\llbracket}
  \SetBreakableRel{\leqslant}
  \SetBreakableRel{\geqslant}
  \SetBreakableRel{\parallelslant}
  \SetBreakableRel{\vDash}
  \SetBreakableRel{\blacktriangleleft}
  \SetBreakableRel{\blacktriangleright}
  \SetBreakableRel{\nleqslant}
  \SetBreakableRel{\ngeqslant}
  \SetBreakableRel{\nparallel}
  \SetBreakableRel{\nparallelslant}
  \SetBreakableRel{\nvDash}
  \SetBreakableBin{\intercal}
  \SetBreakableRel{\varsubsetneq}
  \SetBreakableRel{\notowns}
  \SetBreakableBin{\smallsetminus}
  \SetBreakableRel{\subsetneqq}
  \SetBreakableRel{\rightrightarrows}
  \SetBreakableRel{\leftleftarrows}
```

```
  \SetBreakableRel{\curvearrowleft}
  \SetBreakableRel{\curvearrowright}
  \SetBreakableRel{\Downarrow}
}{}
```

Support Lucida font packages (lucbmath, lucidabr, lucmin, lucmtime, luctime)

```
\ifnum\@ifpackageloaded{lucbmath}{1}{%
\@ifpackageloaded{lucidabr}{1}{%
\@ifpackageloaded{lucmin}{1}{%
\@ifpackageloaded{lucmtime}{1}{%
\@ifpackageloaded{luctime}{1}{0}}}}}=1\relax%
  \SetMathOperator{\surfint}
  \SetMathOperator{\midint}
  \SetMathOperator{\midoint}
  \SetMathOperator{\midsurfint}
  \SetMathOperator{\largeint}
  \SetBreakableRel{\leadsfrom}
  \SetBreakableRel{\defineequal}
  \SetBreakableRel{\notequiv}
  \SetBreakableRel{\notapprox}
  \SetBreakableRel{\notasymp}
  \SetBreakableRel{\notsubset}
  \SetBreakableRel{\notsupset}
  \SetBreakableRel{\notsim}
  \SetBreakableRel{\notsubseteq}
  \SetBreakableRel{\notsupseteq}
  \SetBreakableRel{\notsimeq}
  \SetBreakableRel{\notsqsubseteq}
  \SetBreakableRel{\notsqsupseteq}
  \SetBreakableRel{\notcong}
  \SetBreakableRel{\notni}
  \SetBreakableBin{\boxdot}
  \SetBreakableBin{\boxplus}
  \SetBreakableBin{\boxtimes}
  \SetBreakableBin{\centerdot}
  \SetBreakableRel{\circlearrowright}
  \SetBreakableRel{\circlearrowleft}
  \SetBreakableRel{\leftrightharpoons}
  \SetBreakableBin{\boxminus}
  \SetBreakableRel{\Vdash}
  \SetBreakableRel{\Vvdash}
  \SetBreakableRel{\vDash}
  \SetBreakableRel{\twoheadrightarrow}
  \SetBreakableRel{\twoheadleftarrow}
  \SetBreakableRel{\leftleftarrows}
  \SetBreakableRel{\rightrightarrows}
  \SetBreakableRel{\upuparrows}
  \SetBreakableRel{\downdownarrows}
  \SetBreakableRel{\upharpoonright}
  \SetBreakableRel{\downharpoonright}
  \SetBreakableRel{\upharpoonleft}
  \SetBreakableRel{\downharpoonleft}
  \SetBreakableRel{\rightarrowtail}
  \SetBreakableRel{\leftarrowtail}
  \SetBreakableRel{\leftrightarrows}
```

```
\SetBreakableRel{\rightleftarrows}
\SetBreakableRel{\Lsh}
\SetBreakableRel{\Rsh}
\SetBreakableRel{\rightsquigarrow}
\SetBreakableRel{\leftsquigarrow}
\SetBreakableRel{\leftrightsquigarrow}
\SetBreakableRel{\looparrowleft}
\SetBreakableRel{\looparrowright}
\SetBreakableRel{\circeq}
\SetBreakableRel{\succsim}
\SetBreakableRel{\gtrsim}
\SetBreakableRel{\gtrapprox}
\SetBreakableRel{\multimap}
\SetBreakableRel{\image}
\SetBreakableRel{\original}
\SetBreakableRel{\therefore}
\SetBreakableRel{\because}
\SetBreakableRel{\doteqdot}
\SetBreakableRel{\triangleq}
\SetBreakableRel{\precsim}
\SetBreakableRel{\lesssim}
\SetBreakableRel{\lessapprox}
\SetBreakableRel{\eqslantless}
\SetBreakableRel{\eqslantgtr}
\SetBreakableRel{\curlyeqprec}
\SetBreakableRel{\curlyeqsucc}
\SetBreakableRel{\preccurlyeq}
\SetBreakableRel{\leqq}
\SetBreakableRel{\leqslant}
\SetBreakableRel{\lessgtr}
\SetBreakableRel{\risingdotseq}
\SetBreakableRel{\fallingdotseq}
\SetBreakableRel{\succcurlyeq}
\SetBreakableRel{\geqq}
\SetBreakableRel{\geqslant}
\SetBreakableRel{\gtrless}
\SetBreakableRel{\vartriangleright}
\SetBreakableRel{\vartriangleleft}
\SetBreakableRel{\trianglerighteq}
\SetBreakableRel{\trianglelefteq}
\SetBreakableRel{\between}
\SetBreakableRel{\blacktriangleright}
\SetBreakableRel{\blacktriangleleft}
\SetBreakableRel{\vartriangle}
\SetBreakableRel{\eqcirc}
\SetBreakableRel{\lesseqgtr}
\SetBreakableRel{\gtreqless}
\SetBreakableRel{\lesseqqgtr}
\SetBreakableRel{\gtreqqless}
\SetBreakableRel{\Rrightarrow}
\SetBreakableRel{\Lleftarrow}
\SetBreakableBin{\veebar}
\SetBreakableBin{\barwedge}
\SetBreakableRel{\varpropto}
```

```
\SetBreakableRel{\smallsmile}
\SetBreakableRel{\smallfrown}
\SetBreakableRel{\Subset}
\SetBreakableRel{\Supset}
\SetBreakableBin{\Cup}
\SetBreakableBin{\Cap}
\SetBreakableBin{\curlywedge}
\SetBreakableBin{\curlyvee}
\SetBreakableBin{\leftthreetimes}
\SetBreakableBin{\rightthreetimes}
\SetBreakableRel{\subseteqq}
\SetBreakableRel{\supseteqq}
\SetBreakableRel{\bumpeq}
\SetBreakableRel{\Bumpeq}
\SetBreakableRel{\lll}
\SetBreakableRel{\ggg}
\SetBreakableRel{\pitchfork}
\SetBreakableBin{\dotplus}
\SetBreakableRel{\backsim}
\SetBreakableRel{\backsimeq}
\SetBreakableBin{\intercal}
\SetBreakableBin{\circledcirc}
\SetBreakableBin{\circledast}
\SetBreakableBin{\circleddash}
\SetBreakableRel{\lvertneqq}
\SetBreakableRel{\gvertneqq}
\SetBreakableRel{\nleq}
\SetBreakableRel{\ngeq}
\SetBreakableRel{\nless}
\SetBreakableRel{\ngtr}
\SetBreakableRel{\nprec}
\SetBreakableRel{\nsucc}
\SetBreakableRel{\lneqq}
\SetBreakableRel{\gneqq}
\SetBreakableRel{\nleqslant}
\SetBreakableRel{\ngeqslant}
\SetBreakableRel{\lneq}
\SetBreakableRel{\gneq}
\SetBreakableRel{\npreceq}
\SetBreakableRel{\nsucceq}
\SetBreakableRel{\precnsim}
\SetBreakableRel{\succnsim}
\SetBreakableRel{\lnsim}
\SetBreakableRel{\gnsim}
\SetBreakableRel{\nleqq}
\SetBreakableRel{\ngeqq}
\SetBreakableRel{\precneqq}
\SetBreakableRel{\succneqq}
\SetBreakableRel{\precnapprox}
\SetBreakableRel{\succnapprox}
\SetBreakableRel{\lnapprox}
\SetBreakableRel{\gnapprox}
\SetBreakableRel{\nsim}
\SetBreakableRel{\ncong}
```

```
  \SetBreakableRel{\diagup}
  \SetBreakableRel{\diagdown}
  \SetBreakableRel{\varsubsetneq}
  \SetBreakableRel{\varsupsetneq}
  \SetBreakableRel{\nsubseteqq}
  \SetBreakableRel{\nsupseteqq}
  \SetBreakableRel{\subsetneqq}
  \SetBreakableRel{\supsetneqq}
  \SetBreakableRel{\varsubsetneqq}
  \SetBreakableRel{\varsupsetneqq}
  \SetBreakableRel{\subsetneq}
  \SetBreakableRel{\supsetneq}
  \SetBreakableRel{\nsubseteq}
  \SetBreakableRel{\nsupseteq}
  \SetBreakableRel{\nparallel}
  \SetBreakableRel{\nmid}
  \SetBreakableRel{\nshortmid}
  \SetBreakableRel{\nshortparallel}
  \SetBreakableRel{\nvdash}
  \SetBreakableRel{\nVdash}
  \SetBreakableRel{\nvDash}
  \SetBreakableRel{\nVDash}
  \SetBreakableRel{\ntrianglerighteq}
  \SetBreakableRel{\ntrianglelefteq}
  \SetBreakableRel{\ntriangleleft}
  \SetBreakableRel{\ntriangleright}
  \SetBreakableRel{\nleftarrow}
  \SetBreakableRel{\nrightarrow}
  \SetBreakableRel{\nLeftarrow}
  \SetBreakableRel{\nRightarrow}
  \SetBreakableRel{\nLeftrightarrow}
  \SetBreakableRel{\nleftrightarrow}
  \SetBreakableBin{\divideontimes}
  \SetBreakableRel{\eqsim}
  \SetBreakableRel{\lessdot}
  \SetBreakableRel{\gtrdot}
  \SetBreakableBin{\ltimes}
  \SetBreakableBin{\rtimes}
  \SetBreakableRel{\shortmid}
  \SetBreakableRel{\shortparallel}
  \SetBreakableBin{\smallsetminus}
  \SetBreakableRel{\thicksim}
  \SetBreakableRel{\thickapprox}
  \SetBreakableRel{\approxeq}
  \SetBreakableRel{\succapprox}
  \SetBreakableRel{\precapprox}
  \SetBreakableRel{\curvearrowleft}
  \SetBreakableRel{\curvearrowright}
  \SetBreakableRel{\backepsilon}
\fi
```

Support mathbbol package

```
\@ifpackageloaded{mathbbol}{
  \SetOpenBracket{\Langle}
  \SetOpenBracket{\Lparen}
```

```
}{}
```

Support mathtools/empheq packages

```
\@ifpackageloaded{mathtools}{
  \SetBreakableRel{\vcentcolon}
  \SetBreakableRel{\dblcolon}
  \SetBreakableRel{\coloneqq}
  \SetBreakableRel{\Coloneqq}
  \SetBreakableRel{\coloneq}
  \SetBreakableRel{\Coloneq}
  \SetBreakableRel{\eqqcolon}
  \SetBreakableRel{\Eqqcolon}
  \SetBreakableRel{\eqcolon}
  \SetBreakableRel{\Eqcolon}
  \SetBreakableRel{\colonapprox}
  \SetBreakableRel{\Colonapprox}
  \SetBreakableRel{\colonsim}
  \SetBreakableRel{\Colonsim}
}{}
```

Support mdwmath package

```
\@ifpackageloaded{mdwmath}{
  \SetBreakableBin{\bitand}
  \begingroup
    \catcode`\&\active
    \xdef&{\noexpand\brokenbin{\rmathbr@mathchar{`\&}}}
  \endgroup
  \AtBeginDocument{\mathcode`\&=32768 }
}{}
```

Support sbmm package

```
\@ifpackageloaded{sbbm}{
  \SetOpenBracket{\Lparen}
}{}
```

Support stmaryrd package

```
\@ifpackageloaded{stmaryrd}{
  \SetOpenBracket{\Lbag}
  \SetOpenBracket{\llparenthesis}
  \SetOpenBracket{\binampersand}
  \SetOpenBracket{\llfloor}
  \SetOpenBracket{\llceil}
  \SetOpenBracket{\llbracket}
  \SetBreakableRel{\shortleftarrow}
  \SetBreakableRel{\shortrightarrow}
  \SetBreakableRel{\shortuparrow}
  \SetBreakableRel{\shortdownarrow}
  \SetBreakableBin{\Yup}
  \SetBreakableBin{\Ydown}
  \SetBreakableBin{\Yleft}
  \SetBreakableBin{\Yright}
  \SetBreakableBin{\varcurlyvee}
  \SetBreakableBin{\varcurlywedge}
  \SetBreakableBin{\minuso}
  \SetBreakableBin{\baro}
  \SetBreakableBin{\sslash}
```

```
\SetBreakableBin{\bbslash}
\SetBreakableBin{\moo}
\SetBreakableBin{\varotimes}
\SetBreakableBin{\varoast}
\SetBreakableBin{\varobar}
\SetBreakableBin{\varodot}
\SetBreakableBin{\varoslash}
\SetBreakableBin{\varobslash}
\SetBreakableBin{\varocircle}
\SetBreakableBin{\varoplus}
\SetBreakableBin{\varominus}
\SetBreakableBin{\boxast}
\SetBreakableBin{\boxbar}
\SetBreakableBin{\boxdot}
\SetBreakableBin{\boxslash}
\SetBreakableBin{\boxbslash}
\SetBreakableBin{\boxcircle}
\SetBreakableBin{\boxbox}
\SetBreakableBin{\boxempty}
\SetBreakableBin{\merge}
\SetBreakableBin{\vartimes}
\SetBreakableBin{\fatsemi}
\SetBreakableRel{\sswarrow}
\SetBreakableRel{\ssearrow}
\SetBreakableRel{\curlywedgeuparrow}
\SetBreakableRel{\curlywedgedownarrow}
\SetBreakableBin{\fatslash}
\SetBreakableBin{\fatbslash}
\SetBreakableBin{\lbag}
\SetBreakableBin{\rbag}
\SetBreakableBin{\varbigcirc}
\SetBreakableRel{\leftrightarroweq}
\SetBreakableRel{\curlyveedownarrow}
\SetBreakableRel{\curlyveeuparrow}
\SetBreakableRel{\nnwarrow}
\SetBreakableRel{\nnearrow}
\SetBreakableBin{\leftslice}
\SetBreakableBin{\rightslice}
\SetBreakableBin{\varolessthan}
\SetBreakableBin{\varogreaterthan}
\SetBreakableBin{\varovee}
\SetBreakableBin{\varowedge}
\SetBreakableBin{\talloblong}
\SetBreakableBin{\interleave}
\SetBreakableBin{\obar}
\SetBreakableBin{\obslash}
\SetBreakableBin{\olessthan}
\SetBreakableBin{\ogreaterthan}
\SetBreakableBin{\ovee}
\SetBreakableBin{\owedge}
\SetBreakableBin{\oblong}
\SetBreakableRel{\inplus}
\SetBreakableRel{\niplus}
\SetBreakableBin{\nplus}
```

```
  \SetBreakableRel{\subsetplus}
  \SetBreakableRel{\supsetplus}
  \SetBreakableRel{\subsetpluseq}
  \SetBreakableRel{\supsetpluseq}
  \SetBreakableRel{\trianglelefteqslant}
  \SetBreakableRel{\trianglerighteqslant}
  \SetBreakableRel{\ntrianglelefteqslant}
  \SetBreakableRel{\ntrianglerighteqslant}
  \SetBreakableRel{\arrownot}
  \SetBreakableRel{\Arrownot}
  \SetBreakableRel{\Mapstochar}
  \SetBreakableRel{\mapsfromchar}
  \SetBreakableRel{\Mapsfromchar}
  \SetBreakableBin{\leftrightarrowtriangle}
  \SetBreakableRel{\leftarrowtriangle}
  \SetBreakableRel{\rightarrowtriangle}
  \SetBreakableRel{\longarrownot}
  \SetBreakableRel{\Longarrownot}
  \SetBreakableRel{\Mapsto}
  \SetBreakableRel{\mapsfrom}
  \SetBreakableRel{\Mapsfrom}
  \SetBreakableRel{\Longmapsto}
  \SetBreakableRel{\longmapsfrom}
  \SetBreakableRel{\Longmapsfrom}
}{}
```

Support wasysym package

```
\@ifpackageloaded{wasysym}{
  \SetMathOperator{\varint}
  \SetMathOperator{\iint}
  \SetMathOperator{\iiint}
  \SetMathOperator{\varoint}
  \SetMathOperator{\oiint}
  \SetBreakableBin{\LHD}
  \SetBreakableBin{\RHD}
  \SetBreakableRel{\apprle}
  \SetBreakableRel{\apprge}
  \SetBreakableRel{\wasypropto}
  \SetBreakableRel{\invneg}
  \SetBreakableBin{\ocircle}
  \SetBreakableRel{\logof}
}{}
```

```
} % \rmathbr@patch@commands
```

Execute `\rmathbr@patch@commands` depending on options:

```
\ifrmathbr@patch@begindocument
  \AtBeginDocument{\rmathbr@patch@commands}
\else
  \rmathbr@patch@commands
\fi
```

Switch to active math mode at `\begin{document}`

```
\AtBeginDocument{%
  \mathcode`\==32768% "8000
  \mathcode`\<=32768
```

```
  \mathcode`\>=32768
  \mathcode`\+=32768
  \ifrmathbr@kv@brokenminus
    \mathcode`\-=32768
  \fi
  \mathcode`\*=32768
  \mathcode`\(=32768
  \mathcode`\[=32768 %\]
  \mathcode`\,=32768
  \mathcode`\;=32768
  \mathcode`\:=32768
  \@ifundefined{resetMathstrut@}{}{% fix amsmath
    \let\rmathbr@orig@resetMathstrut=\resetMathstrut@
    \gdef\resetMathstrut@{%
      \mathcode`\(=16424% "4028
      \rmathbr@orig@resetMathstrut
      \mathcode`\(=32768% "8000
    }
    \gdef\newmcodes@{%
      \mathcode`\'=39
      \mathcode`\*=42
      \mathcode`\.=24890% "613A
      \mathcode`\-=45
      \mathcode`\/=47
      \mathcode`\:=24634% "603A
      \relax
    }
  }%
}
```

Patch for bm package:

```
\@ifpackageloaded{bm}{%
  \let\rmathbr@save@bm@general=\bm@general
  \def\bm@general#1#2#3#4#5{
    \rmathbr@save@bm@general{#1}{#2}{%
      \let\nobr\copy
      \def\brokenrel##1{\unvcopy{\brokenrel{##1}}}
      \def\brokenbin##1{\unvcopy{\brokenbin{##1}}}
      \def\brokeninner##1{\unvcopy{\brokeninner{##1}}}
      \def\rmathbr@mathop##1{\unvcopy{\rmathbr@mathop{##1}}}
      \begingroup\catcode`\_\active\lccode`\~`\_\lowercase{\endgroup\def~}##1{\unvcopy{_{##1}}
      \begingroup\catcode`\^\active\lccode`\~`\^\lowercase{\endgroup\def~}##1{\unvcopy{^{##1}}
      #3}{#4}{#5}
  }
  \PackageInfo{rmathbr}{Note: 'bm' package has been patched}{}%
}{}
```

Patch for xy package:

```
\@ifpackageloaded{xy}{%
  \ifnum\rmathbr@kv@scriptsmode>0\relax
    \let\rmathbr@save@xy=\xy
    \let\rmathbr@save@endxy=\endxy
    \def\xy{\begingroup\catcode`\^7\catcode`\_8\rmathbr@save@xy}
    \def\endxy{\rmathbr@save@endxy\endgroup}
    \PackageInfo{rmathbr}{Note: \string\xy and \string\endxy commands from 'xy'
```

```
1833                                    package have been patched}{}%
1834   \fi
1835 }{}
```