`modernruler` Package Documentation

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1 Outline

This package provides modern hrule (`\mruleth`), vrule (`\mruletv`), and `\undernote` internally uses the two commands.

Intput

```
% normal rule
\mruleth[height=1pt, width=5cm, color=blue]

% dashed rule
\mruleth[height=2pt, width=8cm, color=red, dash=true, dash-len=5pt, gap-len=3pt]

% inline rule
This is \mruletv[height=\zw, depth=1.5\zw, width=1pt, color=green] a modern vrule.

% inline dashed rule
This is \mruletv[height=2\zw, width=1.5pt, color=orange, dash=true, dash-len=2pt, gap-len=1pt] a dashed modern vrule.

% undernote
This is under note. This uses \undernote{these commands}{\texttt{\textbackslash mruleh} and \texttt{\textbackslash mrulev}} internally and enables make flexible outputs.
```

Output

This is a modern vrule.

This is a dashed modern vrule.

This is under note. This uses these commands internally and enables make flexible outputs.

`\mruleh` and `\mrulev`

2 Acknowledgements / Credits

This package was inspired by discussions on TeX Forum concerning undernote-like constructions using rules.

An improved approach was later presented by Mr. Yusuke Terada, which clarified several implementation details.

The present package is a complete reimplementation and extension, introducing a generalized rule-based engine, redesigned control flow, and additional features such as modern ruler integration and `tcolorbox`-based abstractions.

Any remaining errors or design decisions are entirely the responsibility of the author.

3 Note

This package only supports LuaLaTeX.

In this package, a unit `\zw` is used in many parts. It is Japanese standard unit, but it's not normal outside of Japan. When you encounter `\zw` in documemntations, please understand it as `1em`. In detail, `\zw` and `1em` is differnt when you use Japanese characters. But only when you use alphabetic characters and numbers, the difference doesn't matter.

4 Installation

Intput

```
\usepackage[<options>]{modernruler}
```

Detailed information regarding the options will be provided in a later section, specifically during the explanation of the `\undernote` command.

5 Commands

5.1 `\mruleth, \mruletv`

5.1.1 Basic Usage

In the first place, `\mruleth` and `mruletv` are extended `\hrule` and `\vrule`. You can use them like this:

Intput

```
\mruleth[<keyvaloptions>]
\mruletv[<keyvaloptions>]
```

These commands share the same keys.

Key	Type	Default	Description
width	dim	0pt	Width of the rule
height	dim	0pt	Height above the baseline
depth	dim	0pt	Depth below the baseline
color	tl	black	Color of the rule
gap-color	tl	white	Color of the gap segments
dash	bool	false	Enables dashed line if true
dash-len	dim	3pt	Length of the dash segment
gap-len	dim	2.5pt	Length of the gap between dashes

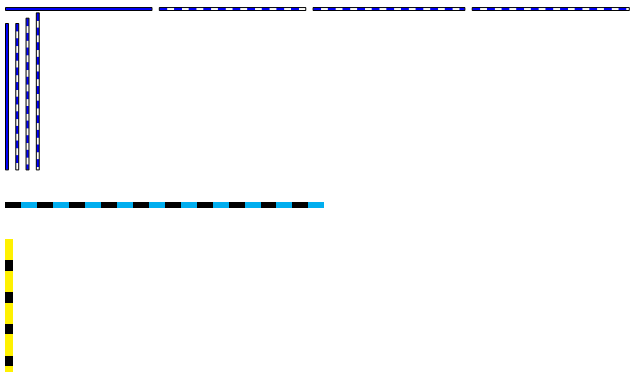
The outputs are as follows:

Intput

```
\fboxsep=0pt\fboxrule=.1pt%

% horizontal rule
\fbox{\mruleth[height=1pt, width=55pt, color=blue]}
\fbox{\mruleth[height=1pt, width=55pt, color=blue, dash=true]}
\fbox{\mruleth[height=1pt, width=57pt, color=blue, dash=true]}
\fbox{\mruleth[height=1pt, width=59pt, color=blue, dash=true]}

% vertical rule
\fbox{\mruletv[width=1pt, height=55pt, color=blue]}
\fbox{\mruletv[width=1pt, height=55pt, color=blue, dash=true]}
\fbox{\mruletv[width=1pt, height=57pt, color=blue, dash=true]}
\fbox{\mruletv[width=1pt, height=59pt, color=blue, dash=true]}\bigskip

% Horizontal: Alternating Black and Cyan segments
\mruleth[width=120pt, height=2pt, dash=true, dash-len=6pt, gap-len=6pt, color
=black, gap-color=cyan]\bigskip

% Vertical: Warning Pattern (Yellow and Black)
```

```
\mruletv[width=3pt, height=50pt, dash=true, dash-len=8pt, gap-len=4pt, color=yellow, gap-color=black]
```

Output



5.1.2 Advanced usage: Use Like Phantom

By setting the width to zero, these commands can be used as ”phantoms” that provide arbitrary height and depth. In a traditional way to set a phantom, you use `\vphantom` or `\hphantom`. However, the total-height or width depends on the argument. So, I recommend you to use the modern-rulers as a flexible phantom.

Intput

```
% To visualize
\fboxrule=.1pt\fboxsep=0pt

% modern-vphantom
abc\fbox{\mruleth[height=2em, depth=.5em, width=0pt]def}ghi

% modern-hphantom
jkl\fbox{\mruletv[height=0pt, width=2em]mno\mruletv[height=0pt, width=1em]}pqr
```

Output

5.2 `\undernote`

5.2.1 Basic Usage

This commands provides underlined annotation. Like this. There is some optional parameters which adjust the position of the annotation text.

Intput

```
% grammar
\undernote<star option>[<number of lines to shift the note downward>]{<the target phrase>}{<annotation>}[<style>]

% example
In this single paragraph, we deliberately place many annotated terms to stress-test the undernote mechanism, starting with a \undernote{concept}{A brief explanation of the main concept} that appears early in the line, followed closely by another\\
\undernote{idea}{A slightly longer explanatory note that is expected to interact with nearby notes} to encourage horizontal overlap detection. As the sentence continues, we insert a fixed-level annotation such as \undernote[2]{method}{This note is forced onto the second vertical level} to verify that manual level assignment overrides automatic stacking, and later a short \undernote{term}{Short note} next to a much longer \undernote*{expression}{This is a considerably longer explanatory note designed to increase the occupied width and push subsequent notes downward in the vertical stacking algorithm}. Near the end of the paragraph, we add one more fixed example, \undernote[3]{result}{A third-level note used to confirm deep stacking}, followed immediately by an automatic one, \undernote*{observation}{This final note should be placed at a safe
```

```
vertical distance determined by the collision analysis performed
during the previous compilation run}.
```

Output

In this single paragraph, we deliberately place many annotated terms to stress-test the undernote mechanism, starting with a concept that appears early in the line, followed

A brief explanation of the main concept

closely by another

idea to encourage horizontal overlap detection. As the sentence continues, we insert a

A slightly longer explanatory note that is expected to interact with nearby notes

fixed-level annotation such as method to verify that manual level assignment overrides

This note is forced onto the second vertical level

automatic stacking, and later a short term next to a much longer expression. Near the

Short note

This is a considerably longer explanatory note designed to increase the occupied width and push subsequent notes downward in the vertical stacking algorithm

end of the paragraph, we add one more fixed example, result, followed immediately by an

A third-level note used to confirm deep stacking

automatic one, observation.

This final note should be placed at a safe vertical distance determined by the collision analysis performed during the previous compilation run

As the example above shows, the star option puts the annotation text in a parabox. So when you include a long description in the fourth argument of the `\undernote`, the option is the best way to avoid overflow.

Regarding the second argument, “number of lines to shift the note downward” is always determined automatically if you don’t specify it. I recommend using this option only when annotations are too close to each other.

Of course, this package provides some package options for adjustments.

Key	Type	Default	Description
notesize	tl	`\footnotesize`	Font size of the note text
notepos	dim	3mm	Minimum vertical length of the line to the note
noteshift	dim	1mm	Vertical shift amount per level for overlapping notes
noterulethickness	dim	.4pt	Thickness of the rule used in the note
noterulehshift	dim	1.5mm	Horizontal offset of the vertical line from the underline start
noterulehsize	dim	1.5mm	Length of the horizontal line extending to the note
notesep	dim	2em	Minimum horizontal distance to prevent note overlap
noteoverhang	dim	3em	Extension length of the note parbox (starred version)
parstyle	int	0	Border style (0: none, 1: solid, 2: dashed)

5.2.2 Additional Description

You can use the command in mathmode.

Intput

```
\[\undernote{x + y}{In the equation envriomnemt.} = \undernote{\frac{a}{b}}{
No problem.}\]
```

Output

$$\underset{\text{In the equation envriomnemt.}}{\underline{x+y}} = \underset{\text{No problem.}}{\underline{\frac{a}{b}}}$$

6 License

Released under the MIT License.

7 Version History

- **v1.0.0–1.1.0** — Initial public release, and add a fallback for `\zw` and `\ltjgetparameter`.
- **v1.3.1 (2026/01/26)** — Fixed a bug which occurs when `\undernote` command is used in mathmode. The bug was caused my misreplacement of `\@elt`.