

LineByLine.sty

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1 Introduction

1.1 Basic Description

LineByLine simplifies the exposition of line-by-line proofs. You enter two pieces of information for each line of a proof separated by an `&`. The first item is set in math mode; the second in text mode. Each line entry starts with the command `\ab` and ends with `\\`.

1.2 Files

The beta version of [linebyline.sty](#) (v1.0) is available from [LaTeX for Philosophers](#).

1.3 Installation

After saving `linebyline.sty` with your other `.sty` files, include

```
\usepackage{linebyline}
```

in the header of your `.tex` file.

The LineByLine environment is designed to be used inside of the `equation` environment. See the examples section for example code and an explanation of some additional features.

2 Examples

The first example provides a template for the environment `\linebyline` defined by `linebyline.sty`. There are two novel features which may be useful. The first is a demonstration of the half-step indentation to allow ‘nesting’, illustrated in lines 4 and 5, the `\mark` command to draw attention to line 6, and the `\sp1` command to split up and align formula within one row. Here is the code for our first example, followed by the compiled version.

Code for Example 1:

```
\begin{equation*}
\begin{linebyline}
\ab AAAA & & \text{Axiom} & \\\
\ab BBBB & & \text{Axiom} & \\\
\ab CCCC & & \text{1, 2 Rule} & \\\
\ab \ab DDDD & & \text{Axiom} & \\\
\ab \ab EEEE & & \text{3, Rule} & \\\
\ab \lmark FFF & & \text{marked line} & \\\
\ab \spl{FFF & = GGG & \& =HHH} & \& \text{split line} \\
\end{linebyline}
\end{equation*}
```

Example 1 compiled:

- 1) $AAAA$ Axiom
- 2) $BBBB$ Axiom
- 3) $CCCC$ 1, 2 Rule
- 4) $DDDD$ Axiom
- 5) $EEEE$ 3, Rule
- 6) $\blacktriangleright FFF$ marked line
- 7) $FFF = GGG$ split line
 $\quad = HHH$

Example 2 is a more realistic example using the above features.

Code for Example 2:

```
\begin{equation*}
\begin{linebyline}
\ab A \wedge B \ \text{rta} \ A & & \text{\& Tautology} & \\\
\ab \Box (A \wedge B \ \text{rta} \ A) & & \text{\& 1, RN} & \\\
\ab \Box (A \wedge B \ \text{rta} \ A) \ \text{rta} & & & \\
\Box (A \wedge B) \ \text{rta} \ \Box A & & \text{\& K axiom} & \\\
\ab \Box (A \wedge B) \ \text{rta} \ \Box A & & \text{\& 2,3 MP} & \\\
\ab \ab A \wedge B \ \text{rta} \ B & & \text{\& Tautology} & \\\
\ab \lmark \ab \Box (A \wedge B) \ \text{rta} \ \Box B & & \text{\& 5, RN \& K} & \\\
\ab \Box (A \wedge B) \ \text{rta} \ \Box A \wedge \Box B & & \text{\& 4, 6 PL} & \\\
\ab A \wedge B \ \text{rta} \ (C \vee D) & & \text{\& Assumption} & \\\
\ab \Box (A \wedge B \ \text{rta} \ (C \vee D)) & & \text{\& 8, RN} & \\\
\ab \spl{ \Box (A \wedge B \ \text{rta} \ (C \vee D)) & & & \\
\end{linebyline}
\end{equation*}
```

```

&\rta \Box (A \wedge B) \rta \Box (C \vee D)} & K Axiom \\
\ab \Box (A \wedge B) \rta \Box (C \vee D) & 9, 10 MP
\end{linebyline}
\end{equation*}

```

Example 2 compiled:

1)	$A \wedge B \rightarrow A$	Tautology
2)	$\Box(A \wedge B \rightarrow A)$	1, RN
3)	$\Box(A \wedge B \rightarrow A) \rightarrow \Box(A \wedge B) \rightarrow \Box A$	K axiom
4)	$\Box(A \wedge B) \rightarrow \Box A$	2,3 MP
5)	$A \wedge B \rightarrow B$	Tautology
6)	► $\Box(A \wedge B) \rightarrow \Box B$	5, RN & K
7)	$\Box(A \wedge B) \rightarrow \Box A \wedge \Box B$	4, 6 PL
8)	$A \wedge B \rightarrow (C \vee D)$	Assumption
9)	$\Box(A \wedge B \rightarrow (C \vee D))$	8, RN
10)	$\Box(A \wedge B \rightarrow (C \vee D))$ $\rightarrow \Box(A \wedge B) \rightarrow \Box(C \vee D)$	K Axiom
11)	$\Box(A \wedge B) \rightarrow \Box(C \vee D)$	9, 10 MP

3 Adjusting vertical space

You might find the line spacing in `\linebyline` crowded, particularly if your proofs involve fractions or matrixes in a row. You can change the vertical line spacing within `linebyline.sty` by adjusting the values for `\arraystretch` in the two lines of code at the end of `linebyline.sty`:

```

% lbyl environment, normal and star versions; 1.5 controls vertical line spacing
\newenvironment{linebyline}{\renewcommand{\arraystretch}{1.5}
\begin{LBLnum}}{\end{LBLnum}}
\newenvironment{linebyline*}{\renewcommand{\arraystretch}{1.5}
\begin{LBLunum}}{\end{LBLunum}}

```

The default value is 1.5, but changing both instances to 2 should give you enough room.

4 Left Alignment

`linebyline.sty` calls the package `amsmath.sty` on its own, but if you include `\usepackage[fleqn]{amsmath}` in the header of your `.tex` file, the

proofs will align left. This ensures that several different proofs will align left, rather than center. If one of your proofs extends to the left past others you are working with, use the `\spl` command to break up longer lines.

5 Numbering

To get rid of the) after each number, open `linebyline.sty` and change

```
\newcommand{\formatLBLcounter}[1]{\arabic{#1}}
```

in the counters section to

```
\newcommand{\formatLBLcounter}[1]{\arabic{#1}}
```

Finally, there is a * version of `linebyline` which removes line numbers altogether. Consider example 3.

Code for Example 3:

```
\begin{equation*}
  \begin{linebyline*}
    \ab AAAA & & Axiom & \\\
    \ab BBBB & & Axiom & \\\
    \ab CCCC & & 1, 2 Rule & \\\
    \ab \ab DDDD & & Axiom & \\\
    \ab \ab EEEE & & 3, Rule & \\\
    \ab \lmark FFF & & marked line & \\\
    \ab \spl{FFF & = & GGG & \\\ & = & HHH} & & split line
  \end{linebyline*}
\end{equation*}
```

Example 3 compiled:

<i>AAAA</i>	Axiom
<i>BBBB</i>	Axiom
<i>CCCC</i>	1, 2 Rule
<i>DDDD</i>	Axiom
<i>EEEE</i>	3, Rule
► <i>FFF</i>	marked line
<i>FFF = GGG</i>	split line
<i>= HHH</i>	