

# bussproofs-colorful

Color extension for the `bussproofs` package

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## Abstract

`bussproofs-colorful` is a small extension to the `bussproofs` package that adds color control for proof trees. It allows users to customize the colors of nodes (formulas), inference lines, and rule labels via package options and runtime commands, while preserving the original layout and spacing of `bussproofs`.

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## 1 Introduction

The `bussproofs` package by Sam Buss is a tool for typesetting natural deduction and sequent-style proof trees in L<sup>A</sup>T<sub>E</sub>X. By default, all elements of a proof tree - formulas, inference lines, and rule labels - are typeset in the surrounding text color.

The `bussproofs-colorful` package provides a thin layer of color-awareness on top of `bussproofs`. It introduces:

- user-level color options for nodes, inference lines, and labels,
- a small theme system,
- runtime commands to change colors locally,
- a convenience environment for local color blocks.

The design goal is *minimal invasion*: the original layout logic of `bussproofs` is preserved. Only selected macros are redefined to wrap their output in color commands.

## 2 Installation

### 2.1 Files

This work currently consists of a single file:

- `bussproofs-colorful.sty`

Place this file somewhere in your T<sub>E</sub>X tree where L<sup>A</sup>T<sub>E</sub>X can find it, for example, in a local directory searched by your distribution or in the same directory as your document.

### 2.2 Loading the package

Load `bussproofs` and then `bussproofs-colorful`:

```
\usepackage{bussproofs}
\usepackage{bussproofs-colorful}
```

You may also pass options to `bussproofs-colorful`, as described in Section 3.

## 3 Package options

The package uses `kvoptions` to provide key–value options. All options are optional; sensible defaults are applied if they are not specified.

### 3.1 Color options

The following options control the default colors at package load time:

`nodecolor=color` Sets the default color for nodes (formulas) in proof trees. Example:

```
\usepackage[nodecolor=red]{bussproofs-colorful}
```

`linecolor=color` Sets the default color for inference lines.

```
\usepackage[linecolor=blue]{bussproofs-colorful}
```

`labelcolor=color` Sets the default color for rule labels.

```
\usepackage[labelcolor=gray]{bussproofs-colorful}
```

If any of these options are omitted, the default is `black`.

### 3.2 Theme option

The `theme` option provides a small set of built-in presets:

`theme=classic` (default) All colors are black.

`theme=dark` White nodes, gray lines, yellow labels.

`theme=pastel` Blue-ish nodes, purple-ish lines, teal-ish labels.

`theme=highcontrast` Black nodes, red lines, blue labels.

Example:

```
\usepackage[theme=dark]{bussproofs-colorful}
```

Themes set the *package defaults*. Runtime colors can still be changed later using the runtime commands described in Section 4.

### 3.3 Patch toggles

The following boolean options control which parts of `bussproofs` are patched:

`patchnodes=true/false` Enable or disable coloring of nodes (formulas).

`patchlines=true/false` Enable or disable coloring of inference lines.

`patchlabels=true/false` Enable or disable coloring of rule labels.

All three default to `true`. For example, to color only lines:

```
\usepackage[
  patchnodes=false,
  patchlabels=false,
  linecolor=red
]{bussproofs-colorful}
```

### 3.4 Debug option

The `debug` option enables informational messages about which patches are applied:

```
\usepackage[debug=true]{bussproofs-colorful}
```

Messages are printed through `\PackageInfo` and can be useful when inspecting interactions with other packages.

## 4 Runtime commands

In addition to package options, `bussproofs-colorful` provides commands to change colors at runtime.

### 4.1 `\SetNodeColor`

```
\SetNodeColor{<color>}
```

Sets the node (formula) color for subsequent proof trees or within the current scope.

## 4.2 `\SetLineColor`

```
\SetLineColor{<color>}
```

Sets the inference line color.

## 4.3 `\SetLabelColor`

```
\SetLabelColor{<color>}
```

Sets the color of the label.

## 4.4 `\ResetProofColors`

```
\ResetProofColors
```

Resets the runtime colors back to the package-level defaults (as determined by options and theme).

## Loading themes at runtime

```
\LoadProofTheme{<theme>}
```

For available themes see Section 3.2.

This updates the runtime colors but does not modify package defaults.

# 5 Environments and scoping

## 5.1 `prooftree` scoping

The package ensures that color changes are scoped to each `prooftree` environment. Colors set inside a proof tree do not leak into subsequent proof trees or the surrounding document, unless you explicitly change them outside.

## 5.2 `ProofColors` environment

The `ProofColors` environment provides a convenient way to apply local colors to a block of content, typically a single proof tree:

```
\begin{ProofColors}[node=red, line=blue, label=green]
... content ...
\end{ProofColors}
```

The optional argument accepts a comma-separated list of key–value pairs:

`node=<color>` local node color

`line=<color>` local line color

`label=<color>` local label color

`theme=<theme>` local theme

These settings are scoped to the environment and do not affect colors outside of it.

# 6 Examples

This section demonstrates the functionality of `bussproofs-colorful` using side-by-side examples. Each example shows the  $\text{\LaTeX}$  source on the left and the rendered output on the right. All examples assume that `bussproofs` and `bussproofs-colorful` are loaded.

## 6.1 Basic usage

Basic proof tree	
<pre>\begin{prooftree}   \AxiomC{A}   \RightLabel{B}   \UnaryInfC{C} \end{prooftree}</pre>	$\frac{A}{C} B$

## 6.2 Setting colors at package load time

Setting colors at package load time	
<pre>\usepackage[   nodecolor=red,   linecolor=blue,   labelcolor=gray ]{bussproofs-colorful}  \begin{prooftree}   \AxiomC{A}   \RightLabel{B}   \UnaryInfC{C} \end{prooftree}</pre>	$\frac{A}{C} B$

## 6.3 Changing colors inside a proof

Changing colors inside a proof	
<pre>\begin{prooftree}   \SetLineColor{red}   \AxiomC{A}    \SetLabelColor{blue}   \RightLabel{R}    \SetLabelColor{green}   \LeftLabel{L}    \SetNodeColor{orange}   \UnaryInfC{B} \end{prooftree}</pre>	$L \frac{A}{B} R$

## 6.4 Using themes

Using themes	
<pre>\usepackage[ theme=highcontrast ]{bussproofs-colorful}  \begin{prooftree}   \AxiomC{A}   \RightLabel{B}   \UnaryInfC{C} \end{prooftree}</pre>	$\frac{A}{C} B$

## 6.5 Combining themes with manual overrides

Combining themes with manual overrides	
<pre>\LoadProofTheme{pastel}  \SetNodeColor{red} \SetLabelColor{blue}  \begin{prooftree}   \AxiomC{A}   \RightLabel{B}   \UnaryInfC{C} \end{prooftree}</pre>	$\frac{A}{C} B$

## 6.6 Switching themes mid-document

Switching themes mid-document	
<pre>\LoadProofTheme{classic}  \begin{prooftree}   \AxiomC{A}   \UnaryInfC{B} \end{prooftree}</pre>	$\frac{A}{B}$
<pre>\LoadProofTheme{pastel}  \begin{prooftree}   \AxiomC{C}   \UnaryInfC{D} \end{prooftree}</pre>	$\frac{C}{D}$

## 6.7 Local color blocks

### Local color blocks with ProofColors

```
\begin{ProofColors}[node=red,
line=gray]
  \begin{prooftree}
    \AxiomC{A}
    \UnaryInfC{B}
  \end{prooftree}
\end{ProofColors}
```

$$\frac{A}{B}$$

## 6.8 Nested ProofColors blocks

### Nested ProofColors blocks

```
\begin{ProofColors}[node=red]
  \begin{prooftree}
    \AxiomC{A}
    \UnaryInfC{B}
  \end{prooftree}

  \begin{ProofColors}[node=blue]
    \begin{prooftree}
      \AxiomC{C}
      \UnaryInfC{D}
    \end{prooftree}
  \end{ProofColors}

  \begin{prooftree}
    \AxiomC{E}
    \UnaryInfC{F}
  \end{prooftree}
\end{ProofColors}
```

$$\frac{A}{B}$$
$$\frac{C}{D}$$
$$\frac{E}{F}$$

## 6.9 Local theme override inside ProofColors

### Local theme override inside ProofColors

```
\LoadProofTheme{classic}

\begin{ProofColors}[theme=pastel]
  \begin{prooftree}
    \AxiomC{A}
    \UnaryInfC{B}
  \end{prooftree}
\end{ProofColors}

\begin{prooftree}
  \AxiomC{C}
  \UnaryInfC{D}
\end{prooftree}
```

$$\frac{A}{B}$$
$$\frac{C}{D}$$

## 6.10 Resetting colors

Resetting colors	
<pre>\SetNodeColor{red} \SetLineColor{blue}  \begin{prooftree}   \AxiomC{A}   \UnaryInfC{B} \end{prooftree}  \ResetProofColors  \begin{prooftree}   \AxiomC{A}   \UnaryInfC{B} \end{prooftree}</pre>	$\frac{A}{B}$ $\frac{A}{B}$

## 6.11 Resetting inside a local block

Resetting inside a local block	
<pre>\begin{ProofColors}[node=red]   \SetNodeColor{green}    \begin{prooftree}     \AxiomC{A}     \UnaryInfC{B}   \end{prooftree}    \ResetProofColors    \begin{prooftree}     \AxiomC{C}     \UnaryInfC{D}   \end{prooftree} \end{ProofColors}</pre>	$\frac{A}{B}$ $\frac{C}{D}$



## 6.12 Full workflow example

Full workflow example	
<pre>\LoadProofTheme{pastel}</pre>	
<pre>\begin{prooftree}   \AxiomC{A}   \UnaryInfC{B} \end{prooftree}</pre>	
<pre>\SetNodeColor{red}</pre>	$\frac{A}{B}$
<pre>\begin{prooftree}   \AxiomC{C}   \UnaryInfC{D} \end{prooftree}</pre>	$\frac{C}{D}$
<pre>\ResetProofColors</pre>	$\frac{E}{F}$
<pre>\begin{ProofColors}[line=gray]   \begin{prooftree}     \AxiomC{E}     \UnaryInfC{F}   \end{prooftree} \end{ProofColors}</pre>	

## 7 Implementation notes

The patching strategy used in `bussproofs-colorful` follows a minimal-invasion approach:

- Most patched macros are direct copies of the corresponding `bussproofs` definitions, with only color insertion points added.
- No structural changes are made to the original layout logic, dimensions, or spacing algorithms.
- The `bussproofs` package itself is not modified; only selected macros are redefined locally.

This design aims to preserve full compatibility with `bussproofs` while enabling color customization.

## 8 Known limitations

- If other packages or user code also redefine the same `bussproofs` macros, the order of loading may matter.
- The package assumes the standard `bussproofs` interface; heavily customized setups may require additional patching.
- Colors are applied via `xcolor`; any limitations of `xcolor` (e.g. unsupported color models) also apply here.

## 9 License and maintenance

This work may be distributed and/or modified under the conditions of the *L<sup>A</sup>T<sub>E</sub>X Project Public License* (LPPL), version 1.3c or any later version. The latest version of this license is available at:

<https://www.latex-project.org/lppl/>

This work has the LPPL maintenance status *maintained*. The current maintainer of this work is Julian (lambdaphoenix).

This work consists of the file `bussproofs-colorful.sty` and this documentation.

## 10 Project Information

The `bussproofs-colorful` package is developed openly on GitHub. Users are encouraged to report issues, request features, or contribute improvements.

### Repository

- Project page: <https://github.com/lambda phoenix/bussproofs-colorful>
- Issue tracker: <https://github.com/lambda phoenix/bussproofs-colorful/issues>

The repository contains:

- the package source file `bussproofs-colorful.sty`
- the documentation source and PDF

### Bug reports and feature requests

If you encounter unexpected behavior, incompatibilities, or missing features, please open an issue on GitHub. When reporting a problem, include:

- a minimal working example (MWE)
- your  $\text{\LaTeX}$  distribution and version
- the package version number

### Contributing

Contributions are welcome. Pull requests should follow the existing code style and include examples when appropriate.

## 11 Change log

### v1.0 (2026/01/27)

- Initial public version.
- Color control for nodes, inference lines, and labels.
- Theme system (`classic`, `dark`, `pastel`, `highcontrast`).
- Runtime commands and `ProofColors` environment.