

The mdframed package¹

auto-split frame environment

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Working with the command `\fbox` or `\fcolorbox`, one has to handle page breaks by hand, meaning that you have to split up the `\fbox` into two. The present package defines the environment `mdframed` which automatically deals with page breaks, whence the name „breakable“.

By using `\newenvironment` the user may choose between several individual designs.

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1. Motivation

Many users wish to (further) emphasize lemmata, definitions, proofs etc. The package `mdframed` allows to create environments with breakable frames. I think an example is the best way to demonstrate the properties.

```
\newtheorem{mdtheorem}{Theorem}[section]
\newenvironment{theorem}{\begin{mdframed}%
  [outerlinewidth=2,leftmargin=40,rightmargin=40,%
  backgroundcolor=yellow,outerlinecolor=blue,%
  splittopskip=\topskip,skipbelow=\baselineskip,%
  skipabove=\baselineskip,ntheorem]%
  \begin{mdtheorem}}{\end{mdtheorem}\end{mdframed}}
\begin{theorem}[Pythagorean theorem]
...
\end{theorem}
```

Theorem 1.1 (Pythagorean theorem) *In any right triangle, the area of the square whose side is the hypotenuse is equal to the sum of the areas of the squares*

¹Extending the package `framed.sty`.

²With thanks to Heiko Oberdiek, Rolf Niepraschk, Martin Scharrer and Herbert Voss.

whose sides are the two legs.

$$a^2 + b^2 = c^2$$

2. Syntax

The package itself loads the packages kvoptions, etoolbox, calc and color. By setting the correct options mdframed will load xcolor, tikz or pstricks.

Load the package as usual:

```
\usepackage[<GLOBAL OPTIONS>]{mdframed}
```

The package defines only one environment with the following syntax:

```
\begin{mdframed}[<LOCAL OPTIONS>]
  <CONTENT>
\end{mdframed}
```

With version 0.8 you have two commands to create environments with mdframed.

\newmdenv The command has the following syntax:

```
\newmdenv[<MDFRAMED OPTIONS>]{Name of the environment}
```

In this way you can simple use:

```
\newmdenv[ linecolor=red , frametitle=Infobox ]{ infobox }
...
\begin{infobox }[ backgroundcolor=yellow ]
foo   foo   foo   foo   foo
\end{infobox }
```

\renewmdenv By using this command you can redefine environments which are created by **\newmdenv**.

\newmdtheoremenv Very often the package is used to highlight theorem environments. So I create a command³ to simplify this process. The command has the following syntax:

```
\newmdtheoremenv[<mdframed-options>]{<envname>}%
[<numberedlike>]{<caption>}[<within>]
```

The last four arguments are equivalent to the command **\newtheorem**. Only the first optional argument is able to pass mdframed-options. A simple example is:

```
\theoremstyle{<some style >}
\newmdtheoremenv[ linecolor=blue ]{lemma}%
{Lemma}[ section ]
...
\begin{lemma}[Some title]
```

³Thanks to Martin Scharrer:

<http://tex.stackexchange.com/questions/26298/own-command-to-create-new-environment>

```

foo   foo   foo   foo   foo   foo
\end{lemma}

```

3. Options

The package allows to set global and local options which are explained below.

3.1. Global Options

The following options are only global options.

- xcolor** By setting this key, the package xcolor will be loaded with the given value(s). default=none
Without any value mdframed loads the package color without any options.
- style** With this key you can change the way frames are drawn. By using **style=0** default=0 the frames are drawn by the \LaTeX -command `\rule`. By setting the key to **style=1** the package tikz will draw the frames. By setting the key to **style=3** the package pstricks will draw the frames. The manipulation of the frames depends on the **style**. For further information see below.

3.2. Global and Local Options

The options listed below can be set globally or locally.

- \mdfsetup** To set the options globally you can use the optional argument of `\usepackage` or you can use the command `\mdfsetup` which is not limited to the header.

3.2.1. Options with lengths

In figure (1) you can see the adjustable lengths which will be described below. All lengths accept two kinds of input. The first one is a length (e.g. 2pt) and the second one is a number (e.g. 2) which will be multiplied by **defaultunit**.

- defaultunit** see the sentence above. default=pt

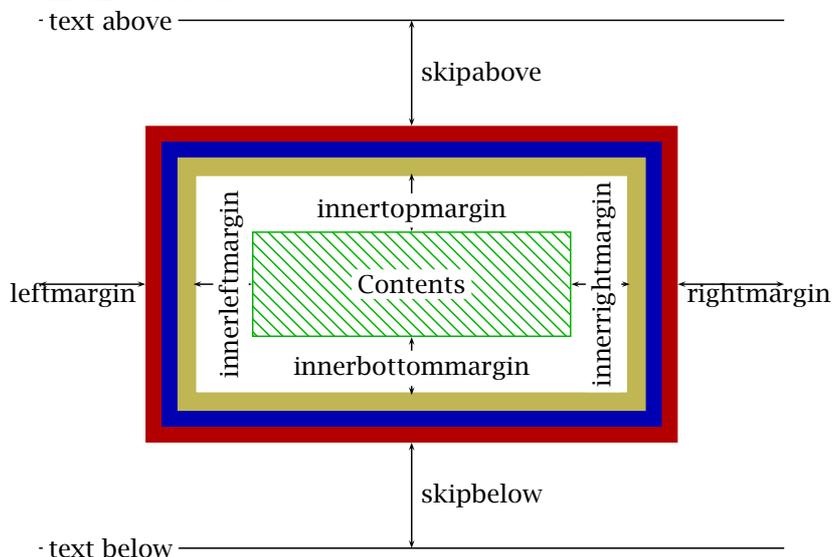


Figure 1: adjustable lengths of mdframed

skipabove	Sets an additional skip above the frame.	default=0pt
skipbelow	Sets an additional skip below the frame.	default=0pt
margin	This option is not longer supported. Use leftmargin and rightmargin instead.	
leftmargin	Sets the length of the left margin of the environment.	default=0pt
rightmargin	Sets the length of the right margin of the environment.	default=0pt
innerleftmargin	Sets the length of the inner left margin of the environment.	default=10pt
innerrightmargin	Sets the length of the inner right margin of the environment.	default=10pt
innertopmargin	Sets the length of the inner top margin of the environment.	default=.4\baselineskip
innerbottommargin	Sets the length of the inner bottom margin of the environment.	default=.4\baselineskip

The following lengths are not shown in figure (1).

splittopskip	Sets the length of the skip above the splitted part of the environment.	default=0pt
splitbottomskip	Sets the length of the skip below the splitted part of the environment.	default=0pt
linewidth	Sets the width of the line around the environment.	default=0.4pt
roundcorner	Sets the size of the radius of the corners of the frames. This works only with <code>style=1</code> and <code>style=3</code>.	default=0pt
innerlinewidth	Sets the width of the inner line around the environment. This works only with <code>style=1</code>.	default=0pt
outerlinewidth	Sets the width of the outer line around the environment. This works only with <code>style=1</code>.	default=0pt
middlelinewidth	Sets the width of the middle line around the environment. This works only with <code>style=1</code>.	default=linewidth

3.2.2. Colored Options

linecolor	Sets the color of the line around the environment.	default=black
innerlinecolor	Sets the color of the inner line around the environment. This works only with <code>style=1</code>.	default=linecolor
middlelinecolor	Sets the color of the middle line around the environment. This works only	default=linecolor

with **style=1**.

outerlinecolor	Sets the color of the outer line around the environment. This works only with style=1.	default=linecolor
backgroundcolor	Sets the color of the background of the environment.	default=white
fontcolor	Sets the color of the contents of the environment.	default=black

3.3. Hidden Lines

topline	Draws a line at the top.	default=true
bottomline	Draws a line at the bottom.	default=true
leftline	Draws a line on the left.	default=true
rightline	Draws a line on the right.	default=true

3.4. Frametitle

frametitle	The environment get a title. To set a title use frametitle={The Title of the frame} as an option of the environment.	default=none
frametitleformat	Sets the format of the frame title.	default=\bfseries \large

3.4.1. Useful options

ntheorem	Before setting this boolkey, you have to load the package ntheorem. With this option you set the values <code>\theorempreskipamount</code> and <code>\theorempostskipamount</code> to 0pt.	default=false
pstrickssetting	With this key you can pass several options to <code>\psset</code> . For example if you want all lines dashed you will have to set pstrickssetting={linestyle=dashed} . It is very important to put the options of pstrickssetting in brackets. This works only with style=3.	default=none
tikzsetting	With this key you can pass several options to <code>\tikzset</code> . Some examples are listed in the next section. It is very important to put the options of tikzsetting in brackets. This works only with style=1.	default=none

4. Examples

Now I present some examples. Of course I know that some of them are only gimmick. To create the following examples I am using **style=1**.

```
\mdfsetup{outerlinewidth=5pt,innerlinewidth=0pt,
outerlinecolor=red,roundcorner=5pt}
```

Some Text Some Text Some Text Some Text Some Text Some Text
 Some Text Some Text Some Text Some Text Some Text Some Text
 Some Text Some Text Some Text Some Text Some Text Some Text
 Some Text Some Text Some Text Some Text Some Text Some Text
 Some Text Some Text Some Text Some Text Some Text Some Text

Now I will add the next options

```
\mdfsetup{ topline=false , leftline=false , }
```

Some Text Some Text Some Text Some Text Some Text Some Text
 Some Text Some Text Some Text Some Text Some Text Some Text
 Some Text Some Text Some Text Some Text Some Text Some Text
 Some Text Some Text Some Text Some Text Some Text Some Text
 Some Text Some Text Some Text Some Text Some Text Some Text

Gimmick:

```
\mdfsetup{ splitbottomskip=0.8cm, splittopskip=0cm,
  innerrightmargin=2cm, innertopmargin=1cm, %
  innerlinewidth=2pt, outerlinewidth=2pt,
  middlelinewidth=10pt, backgroundcolor=red,
  linecolor=blue, middlelinecolor=gray,
  tikzsetting={draw=yellow, line width=3pt, %
    dashed, %
    dash pattern= on 10pt off 3pt},
  rightline=false, bottomline=false }
```

Some Text Some Text Some Text Some Text Some Text
 Some Text Some Text Some Text Some Text Some Text
 Some Text Some Text Some Text Some Text Some Text
 Some Text Some Text Some Text Some Text Some Text
 Some Text Some Text Some Text Some Text Some Text
 Some Text Some Text Some Text Some Text Some Text

4.1. Working with twocolumn

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

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Some Text Some Text Some Text
Some Text Some Text Some Text

5. Errors, Warnings and Messages

The package `mdframed` provides different errors, warnings and messages in the `log-file`. Some \LaTeX -editors like `TEXMaker(X)` have a special tab for errors and warnings but not for messages. So you should look in the `log-File`.

The followings errors and warnings are generated by `mdframed`.

```
The package ... does not exist but
it is required by mdframed
```

To avoid this problem you should install the required package which are named in section [Syntax](#).

```
The style number ... does not exist
mdframed ues instead style=0
```

If you set the option `style` and a file `md-frame-'number'.mdf` does not exist you will get this warning. So check the option `style`.

```
You have not loaded ntheorem yet
```

To use the option `ntheorem` you have to load the package `ntheorem`.

```
You have only a width of 3cm
```

The package `mdframed` calculate the width of the contents by given options. If the width of the contents smaller then 3 cm you will get this warnings. You should change the settings to get a greater width.

```
You got a bad break
you have to change it manually
by changing the text, the space
or something else
```

Sometimes you have enough vertical space for the rules and the space between the rules and the contents but not for the contents itself. In this situation you will get this warning because the contents of this box is empty. You have the possibility to change the settings or include a `\clearpage` in front of the environment `mdframed`. So far I have no idea to avoid such things.

```
You got a bad break
because the splittet box is empty
You have to change the page settings
like enlargethispage or something else
You got a bad break
```

See the explanation above.

```
You got a bad break
because the last splittet box is empty
You have to change the settings
```

The same reason as above but only in the last box.

```
Option ... is already consumed
and has no effect on input line ...
```

If you set a global option inside the document body you will get this warning.

6. Known Problems

In this section I will collect known problems. In case you encounter any further problems, please drop me an email, marco.daniel@mada-nada.de.

Do you have any ideas / wishes on further extensions to this package? Please let me know!

1. So far the environment isn't compatible with the package `gmverb`.
2. So far it isn't possible to combine the environment `\begin{multicols}` of the package `multicol` with `mdframed`.
3. So far it isn't possible to use footnotes.

7. ToDo

1. see „Known Problems“.
2. Work with `twoside`-mode by setting `inner` and `outer`.
3. Create new styles.
4. Improve page breaks.

8. Previous versions

With the new version 0.7a I changed the internal commands (I use `etoolbox`) and the algorithm of the splitting. So I don't know whether I will get new bugs or not. For the last case and the previous version (v0.6) works well you can load `mdframedpre` instead of `mdframed`.

9. Acknowledgement

Thanks for the bug reports and suggestions

Dick Nickalls; Dr. Dietrich Grau; Piazza Luca.

Thanks for proofreading

Nahid Shajari.

A. More information

In the following section I want to present how to create your own frame.

A.1. How does mdframed work?

With the environment `\begin{mdframed} ... \end{mdframed}` the whole contents will be saved in a `\savebox` called `\@tempboxa`. After the calculation of the width and the height of the `\@tempboxa` (done by `mdframed.sty`) the box will be set sequentially (done by `md-frame-X.mdf`). The following figure demonstrates this.

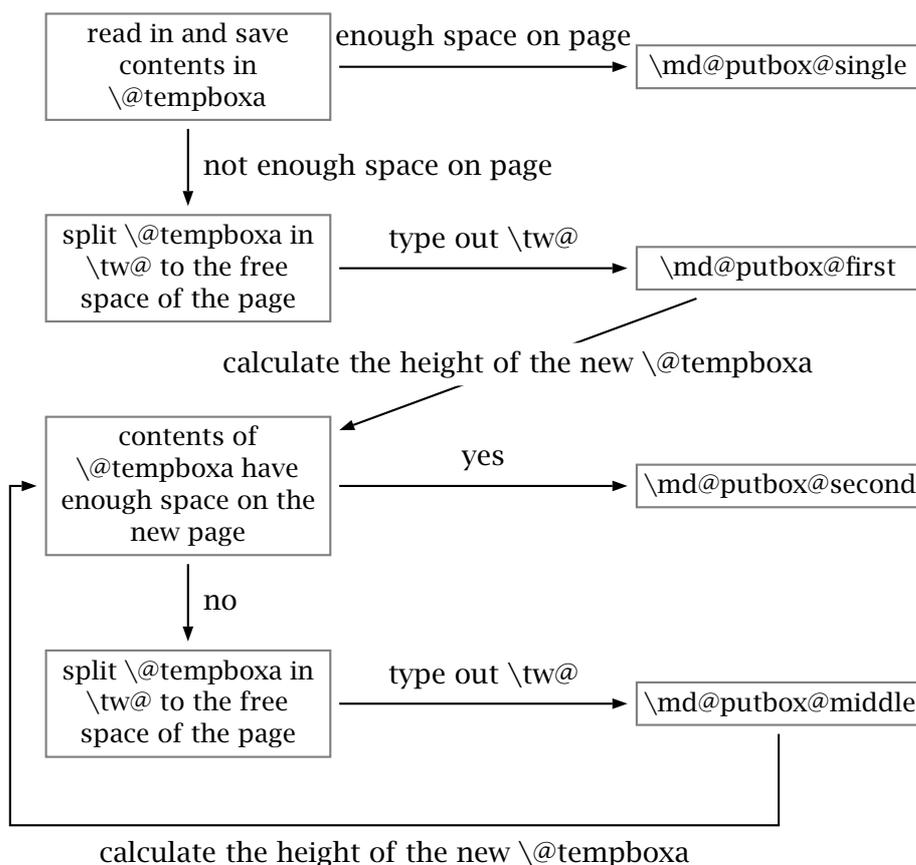


Figure 2: Setting the contents of mdframed

The width of the contents is the result of the settings of `leftmargin`, `rightmargin`, `linewidth`, `innerleftmargin` and `innerrightmargin` (see figure (1)).

A.2. The Framecommands

The package `mdframed` knows four kinds of „Framecommand“. These commands tell `LaTeX` how to set the contents of `mdframed`.

`\md@putbox@single` This command sets the contents of a single non-split frame.

`\md@putbox@first` This command sets the contents of the first frame of a splitted frame.

\md@putbox@middle This command sets the contents of the middle frame of a splitted frame.

\md@putbox@second This command sets the contents of the last frame of a splitted frame.

Uses the explained commands we give an example. The command `\box` use the contents of the savebox and types them out.

First we want to type out the single box without any settings (but with the calculated width).

```
\makeatletter
\def\md@putbox@single{\box\@tempboxa}
\makeatother
```

I am using the command `\leftline` to start the „Framecommands“ at the left.

```
\makeatletter
\def\md@putbox@single{\leftline{\box\@tempboxa}}
\makeatother
```

Now you have to know how the lengths are named. Every length which can be modified by the options has the following syntax

```
\mdf@'Name of the Length'@length
```

For example the `leftmargin` is

```
\mdf@leftmargin@length
```

To create only a line at the left with the correct **leftmargin** you can set `\md@putboxsingle` as follows

```
\makeatletter
\def\md@putbox@single{%
  \leftline{%
    \hspace*{\mdf@leftmargin@length}%
    \rule[-\dp\@tempboxa]{\mdf@linewidth}%
      {\ht\@tempboxa+\dp\@tempboxa}%
    \box\@tempboxa
  }%
}
\makeatother
```

In this way you can do what you want. If you create your own style you can save the file as `md-frame-X.mdf`. X must be an integer. In this way you can use the option **style** to load the file by setting **style=X**.