The \texttt{mdframed} package\footnote{Extending the package \texttt{framed.sty}}

auto-split frame environment

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The standard methods for framing text (\texttt{\fbox} or \texttt{\fcolorbox}) require you to handle page breaks by hand, meaning that you have to split the \texttt{\fbox} into two. The present package defines the environment \texttt{mdframed} which automatically deals with page breaks in framed text.

By defining new environments the user may choose between several individual designs.

Linked files: \texttt{mdframed-example-default.pdf} \texttt{mdframed-example-tikz.pdf} \texttt{mdframed-example-pstricks.pdf} \texttt{mdframed-example-texsx.pdf}

FYI: I create a repository for \texttt{mdframed} on github where you can download the current development status.

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1. Motivation

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

**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 whose sides are the two legs.*

\[ a^2 + b^2 = c^2 \]

The frame was defined with the following settings.

\[
\begin{verbatim}
\newmdtheoremenv[%
    outerlinewidth = 2 ,%
    roundcorner = 10pt ,%
    leftmargin = 40 ,%
    rightmargin = 40 ,%
    backgroundcolor = yellow !40 ,%
    outerlinecolor = blue !70 ! black ,%
    innertopmargin = \topskip ,%
    splittopskip = \topskip ,%
    ntheorem = true ,%
]{}{Theorem }{}\section
\begin{theorem}[Pythagorean theorem]
\end{theorem}
\end{verbatim}
\]

2. **Syntax**

**Required packages by mdframed**
The package itself loads the packages

\[
\text{kvoptions} \quad \text{xparse} \quad \text{etoolbox} \quad \text{color}.
\]

Depending on the option `framemethod` `mdframed` will load

\[
\text{xcolor} \quad \text{tikz} \quad \text{pstricks}.
\]

Load the package as usual:

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

Only the option `framemethod` should be loaded by the optional argument of `usepackage`. All other options should be loaded with `mdfsetup` or related environments. The package should be loaded after `amsthm` if you need the package.

**Provided environment**
The package defines only one environment with the following syntax:

\[
\begin{mdframed}[<LOCAL OPTIONS>]
\end{mdframed}
\]
4. Commands

To create own environments with \texttt{mdframed} see section 4.

\textbf{Autodetecting floats}

\texttt{mdframed} detects whether the environment is used inside \texttt{float} or \texttt{minipage} environments. If you use \texttt{mdframed} in such an environment \texttt{mdframed} will use the option \texttt{nobreak} automatically.

3. The frames

Normally you can say \texttt{mdframed} draws only some lines. To allow page breaks the following designs are supported. If you load the package with \texttt{framemethod=default} you can only draw a single line. Inside the gray boxes of the images below the text will be printed.

\begin{figure}
\centering
\begin{tabular}{cc}
\textbf{Frame of a single page} & \textbf{First box – first part of the output} \\
\includegraphics[width=0.4\textwidth]{first_box} & \includegraphics[width=0.4\textwidth]{first_box_output} \\
\textbf{Second box – last part of the output} & \textbf{Middle box – middle part of the output} \\
\includegraphics[width=0.4\textwidth]{second_box} & \includegraphics[width=0.4\textwidth]{middle_box}
\end{tabular}
\caption{The basic frames}
\end{figure}

4. Commands

The following commands should countenance your by the handling with \texttt{mdframed}.
\begin{verbatim}
\newmdenv[options]{env-name}
\end{verbatim}

The command allows the definition of a new environment which is surrounded by \texttt{mdframed}. The command has the following syntax:
\begin{verbatim}
\newmdenv{<MDFRAMED OPTIONS>}{Name of the environment}
\end{verbatim}

In this way you can say:
5. Defining your own style

\newmdenv[\textcolor{red}, \textbf{frametitle=Infobox}]{infobox}
\begin{infobox}[\textcolor{yellow}]{infobox}
Some Infos \ldots
\end{infobox}

\renewmdenv[options]{env-name}
By using this command you can redefine environments which are created by \newmdenv.

\surroundwithmdframed[options]{environment}
Sometimes you have predefined environments. This commands allows you to surround an predefined environment with \texttt{mdframed} without changing the original name. To set a \texttt{mdframed} around the environment \texttt{verbatim} you can simple say.

\surroundwithmdframed[\texttt{linewidth=2pt}]{verbatim}

\mdflength[options]
If you want to work with length defined by \texttt{mdframed} (for example \texttt{innerleftmargin}) you can use the command \texttt{mdflength}.

The distance is \texttt{hspace{\mdflength[innerleftmargin]}} \texttt{the\mdflength[innerleftmargin]}

The result will be:

The distance is 10.0pt

\mdfsetup[options]
To set the options you can use the optional argument of \texttt{usepackage} or you can use the command \texttt{mdfsetup} which is not limited to the preamble. Inside a group the settings work only local.

At this point I want to recommend the usage of the command \texttt{mdfsetup} instead of setting package option via the optional argument of \texttt{usepackage}. So you are avoiding breaking of non robust commands.\(^2\) The sole exception is the option \texttt{framemethod} which must given as an optional argument of \texttt{usepackage}.

5. Defining your own style

In the next section all options are introduced. However instead of passing them global or as an optional argument of the environment you can define your own styles. The method is as follows

\mdfdefinestyle[style name]{options}
\mdfdefinestyle allows the user to define different styles which can be used as an option of \texttt{mdframed} via \texttt{style}.

\mdfappntodefinestyle[style name]{options}
This commands add options to a defined style.\(^3\)

\(^2\)Thanks to Heiko Oberdiek and Philipp Stephani: koptions-Declaration von Optionen schlägt fehl
\(^3\)Thanks to Martin Scharrer and Enrico Gregorio: http://tex.stackexchange.com/questions/34684/argument-of-setkeys

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**style**

If you define a special style with `\mdfdefinestyle` you can use the key `style` to load the style. `mdframed` has no predefined styles yet.

Here a small example:

```latex
\mdfdefinestyle{mystyle}{leftmargin=1cm,linecolor=blue}
\begin{mdframed}[style=mystyle]
foo
\end{mdframed}
```

### 6. Options

The package provides various options to manipulate frames. In the following section all options are listed. Some internal macros which can be manipulated are not shown in this documentation. The listed options are divided in global and local options. The global options can not be used inside `\mdfsetup`.

#### 6.1. 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). Without any value `mdframed` loads the package `color` without any options. If the package `xcolor` is already loaded the given option will be ignored. I recommend to load `xcolor` before `mdframed`.

**framemethod**

With this key you can change the way frames are drawn. You can decide whether the frame is drawn with

1. \LaTeX-commands `\hrule, \vrule, \rule`,
2. TikZ (the package `TikZ` will be loaded) or
3. PSTricks (the package `pstricks` will be loaded).

The option `framemethod` requires a string. Allowed combinations are listed in the following table.

<table>
<thead>
<tr>
<th>Method</th>
<th>Allowed keys</th>
</tr>
</thead>
<tbody>
<tr>
<td>\LaTeX-commands</td>
<td>default, tex, latex, none, 0</td>
</tr>
<tr>
<td>TikZ</td>
<td>tikz, pgf, 1</td>
</tr>
<tr>
<td>PSTricks</td>
<td>pstricks, ps, postscript, 2</td>
</tr>
</tbody>
</table>

If you are lazy you can also work with the following short forms: `tikz`, `TikZ`, `pstricks`, `PSTricks` or `ps`. Of course for the default method exists no key.

**FYI**

It is independently whether the `method` is written with no, one or more capital letter.

All other options listed below can be set globally or locally and they are not limited to the preamble. I was trying to define self explained names.
6.2. Restoring the settings

Sometimes it’s useful to remove all done settings. Every default value is saved in a style which can be called by the option \texttt{default} or a more suitable name \texttt{style=defaultoptions}. Both do the same.

Here a small example:

\begin{verbatim}
\mdfsetup{
    middlelinecolor=red,
    middlelinewidth=2pt,
    backgroundcolor=red!10,
    roundcorner=10pt}
\begin{mdframed}
  Text \par Text
\end{mdframed}
\begin{mdframed}[default]
  Text \par Text
\end{mdframed}
\end{verbatim}

6.3. Options with lengths

In figure (2) you can see the adjustable lengths (compare also figure (1)).
6.4. Colored Options

defaultunit default=pt

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 \texttt{1 defaultunit}. To get a better overview, all length options with their default value are listed in a table. I think the names are self-explained so that don't describe it anymore. Although special hints and length are described below.

The first table lists the length for the geometry of the frame.

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>skipabove</td>
<td>= 0pt</td>
</tr>
<tr>
<td>leftmargin</td>
<td>= 0pt</td>
</tr>
<tr>
<td>innertopmargin</td>
<td>= 5pt</td>
</tr>
<tr>
<td>innerleftmargin</td>
<td>= 10pt</td>
</tr>
<tr>
<td>innerbottommargin</td>
<td>= 5pt</td>
</tr>
<tr>
<td>rightmargin</td>
<td>= 0pt</td>
</tr>
<tr>
<td>innerrightmargin</td>
<td>= 10pt</td>
</tr>
</tbody>
</table>

Before the next options are introduced here an example where the described length are used.

\begin{mdframed}[style=mdfexample1]
\begin{itemize}
  \item 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 whose sides are the two legs.
\end{itemize}
\end{mdframed}

The next table lists the options to manipulate the lines of \texttt{mdframed}. If you are working with \texttt{framemethod=default} you have only one line for framing.

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>linewidth</td>
<td>= 0.4pt</td>
</tr>
<tr>
<td>innerlinewidth</td>
<td>= 0pt</td>
</tr>
<tr>
<td>middlelinewidth</td>
<td>= 0.4pt</td>
</tr>
<tr>
<td>outerlinewidth</td>
<td>= 0pt</td>
</tr>
<tr>
<td>roundcorner</td>
<td>= 0pt</td>
</tr>
</tbody>
</table>

If you are working with \texttt{framemethod=tikz} or \texttt{framemethod=pstricks} the option \texttt{linewidth} is an alias for the option \texttt{middlelinewidth}.

6.4. Colored Options

Now we want to bring some color on your frames. The limitation is equal the the length options. For \texttt{framemethod=default} you have only one line.

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>linecolor</td>
<td>= black</td>
</tr>
<tr>
<td>innerlinecolor</td>
<td>= black</td>
</tr>
<tr>
<td>middlelinecolor</td>
<td>= black</td>
</tr>
<tr>
<td>outerlinecolor</td>
<td>= black</td>
</tr>
<tr>
<td>backgroundcolor</td>
<td>= white</td>
</tr>
<tr>
<td>fontcolor</td>
<td>= black</td>
</tr>
</tbody>
</table>

Although it's no really a color options you can also specify the font of the contents. Therefore the option \texttt{font} can be used.

Ok after we have some lengths and some colors we can improve our example.
6.5. Shadows

Another possibility to highlight a frame can be a shadow. The package \texttt{mdframed} supports some elementary options to add a shadow. For \texttt{framemethod=tikz} the library \texttt{shadows} is needed which must be loaded by the user by \texttt{\usetikzlibrary{shadows}}.

\begin{mdframed}[backgroundcolor=gray!40,shadow=true,roundcorner=8pt]
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 whose sides are the two legs.
\end{mdframed}

If a shadow is used depends on the option \texttt{shadow} which can be either \texttt{true} or \texttt{false}. The option \texttt{shadows} enables two new options \texttt{shadowsize} and \texttt{shadowcolor}.

6.6. Hidden Lines

The default behaviour of the output was shown in a previous picture. \texttt{mdframed} offers the possibility to print only requested lines. If you don’t want any right line you can say \texttt{rightline=false}. The table below listed all keys to this topic and shows their default setting.

<table>
<thead>
<tr>
<th>Key</th>
<th>Default Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{topline}</td>
<td>\texttt{true}</td>
</tr>
<tr>
<td>\texttt{rightline}</td>
<td>\texttt{true}</td>
</tr>
<tr>
<td>\texttt{leftline}</td>
<td>\texttt{true}</td>
</tr>
<tr>
<td>\texttt{bottomline}</td>
<td>\texttt{true}</td>
</tr>
</tbody>
</table>

\texttt{hidealllines}

If you want to disable all lines you can use the short from \texttt{hidealllines}.
6.7. Working in twoside-mode

Many books are written in twoside mode. In those cases it’s better to set the margins related to the site. Instead of the explained options leftmargin and rightmargin you can work with the options outermargin and innermargin. Of course if you working in oneside mode the options have no effect. If you don’t want to work with outermargin and innermargin whether the document is done in twoside mode you can disable the behaviour by the option usetwoside. Allowed values for this key are true or false.

6.8. Footnotes

Inside the environment you can use the command \footnote as usual. mdframed uses the syntax of environment minipage with the same counter.

Every footnote text will be collected inside a box and will be displayed at the end of the environment mdframed.

footnotedistance \bigskipamount
The length is the distance between the end of the environment mdframed and the displaying of the \footnoterule.

footnoteinside true
The position of the footnotes can be changed with the option footnoteinside. The footnotes will be displayed at the end of the environment but you can decide whether the output is inside mdframed or after.

Note
The output of the footnotes with the option footnoteinside=false are not in a splitted frame. I think it isn’t useful because the first line of a new page shouldn’t be a footnote.

6.9. Page breaks

The package mdframed splits its content if neccessary. In figure 1 the default style for splitting is presented. However there a sevaral situations where no page preak should occur.

nobreak false
For this case you can use the option nobreak which is either true or false. As you can see in figure 1 the different elements have different ways of drawing. E.g. the middle part of mdframed has only a left and a right line.

everyline false
If you want that all parts of mdframed get a whole frame you can work with the option everyline. Then all parts are displayed as a single frame.

In a previous section the options innertopmargin and innerbottommaring were introduced. However if a page break occurs you have two new length options which influence the space at the breaking point.

splittopskip 0 pt
Sets the length of the skip above the split part of the environment.

splitbottomskip 0 pt
Sets the length of the skip below the split part of the environment.
6.10. Frametitle

In this section all relevant options of the frame title will be presented. They are not divided in their properties.

- **frametitle** default=none
  
The environment gets a title. To set a title use `frametitle={The Title of the frame}` as an option of the environment.

- **frametitlefont** default=\normalfont\bfseries
  
  Sets the format of the frametitle.

- **frametitlealignment** default=\raggedleft
  
  Align the frametitle. This option must be set via \mdfsetup.

- **frametitlerule** default=false
  
  Set this key to true to get a line between the frame title and the text.

- **frametitlerulewidth** default=.2pt
  
  Sets the width of the line between the text and the title of mdframed.

- **frametitleaboveskip** default=5pt
  
  Sets the skip of the frame title to the margin above of mdframed.

- **frametitlebelowskip** default=5pt
  
  Sets the skip of the frame title to the rule of the frame title.

- **frametitlebackgroundcolor** default=backgroundcolor
  
  Sets the color of the background of the frametitle

- **repeatframetitle** default=false
  
  Repeat the frame title on every frame.

  The following picture demonstrates the behaviour of the lengths if the option `frametitle` is used.

---

**Figure 3:** Behavior of the lengths if `frametitle` is used

---

**FYI and Note**

The splitting of the frame title is really a fiddly issue. If you want to use the option `repeatframetitle` a splitting is more than wrong. On the other hand if you use the option `repeatframetitle` the user must prepare the contents well.
6.11. Title commands inside the environment

To provide titles inside the environment \texttt{mdframed} you can use \texttt{\mdfsubtitle}. The relevant options are listed below.

\texttt{\mdfsubtitle}

Set a title inside \texttt{mdframed} of the internal level 1.

The command accepts one optional and one mandatory argument. The optional argument sets the option of \texttt{mdframed} whereby everything will be local. The second argument of subtitle also allows paragraph breaking.

Breaks inside the \texttt{\mdfsubtitle} are not supported.

\texttt{\mdfsubtitle}[<options>]{the subtitle}

6.11.1. Options related to the title of level 1

\texttt{subtitleaboveline}

Decide to draw a line above the subtitle.

\texttt{subtitlebelowline}

Decide to draw a line below the subtitle.

\texttt{subtitlefont}

Sets the font for subtitles.

\texttt{subtitlebackgroundcolor}

Sets the background color of the subtitle between the above and below line.

\texttt{subtitleabovelinecolor}

Sets the line color of the line above.

\texttt{subtitlebelowlinecolor}

Sets the line color of the line below.

\texttt{subtitleabovelinewidth}

Sets the line width of the line above.

\texttt{subtitlebelowlinewidth}

Sets the line width of the line below.

\texttt{subtitleaboveskip}

Sets the skip before the subtitle line above will be drawn.

\texttt{subtitlebelowskip}

Sets the skip after the subtitle line below is drawn.

\texttt{subtitleinneraboveskip}

Sets the skip after the line above and the subtitle itself.

\texttt{subtitleinnerbelowskip}

Sets the skip after the subtitle and the line below.

Here an example to demonstrate the behaviour:
6.12. General options

Some options can’t be classified. Such options are listed in this section.

\newmdenv[%
  roundcorner=5pt,
  subtitlebelowline=true,subtitleaboveline=true,
  subtitlebackgroundcolor=yellow!70!white,
  backgroundcolor=blue!20!white,
  frametitle={Theorem},frametitleerule=true,
  frametitlebackgroundcolor=yellow!70!white,
] {subtitleenv}
\begin{subtitleenv}
  Some Text \ldots
  \mdfsubtitle{Notes}
  Some Text \ldots
\end{subtitleenv}

Some options can’t be classified. Such options are listed in this section.

\newmdenv[%
  roundcorner=5pt,
  subtitlebelowline=true,subtitleaboveline=true,
  subtitlebackgroundcolor=yellow!70!white,
  backgroundcolor=blue!20!white,
  frametitle={Theorem},frametitleerule=true,
  frametitlebackgroundcolor=yellow!70!white,
] {subtitleenv}
\begin{subtitleenv}
  Some Text \ldots
  \mdfsubtitle{Notes}
  Some Text \ldots
\end{subtitleenv}

6.12. General options

Some options can’t be classified. Such options are listed in this section.

ntheorem default=false

Before setting this boolean key, you have to load the package ntheorem. With this option you set the values \theorempreskipamount and \theorempostskipamount to 0 pt to avoid extra vertical skip.

needspace default=0 pt

Sometimes it is useful to set a minimum height before a frame should be splitted. For such cases you can use needspace. The option requires a length which sets the minimum height before a frame will be splitted.

ignorelastdescenders default=false

Try to ignore the last descenders of the environment mdframed. The complete idea was inspired by Tobias Weh and the solution was provided by Stefan Lemke. See How to make mdframed ignore descenders in last line Of course you have some more length which can be manipulate.

userdefinedwidth default=\linewithth

Sets the width of the whole mdframed environment. The width represent the width including the line width and the inner margins. The outer margins will be ignored.

align default=left

Sometimes it is useful to align the environment itself. For this you have the option align which can be set to the following strings:

- left,
- right and
- center.
The alignments left or right depend on the given lengths leftmargin and rightmargin. Later I will present an example to demonstrate my bad English explanation.

Be aware of using this option please.

6.13. TikZ options

tikzsetting default={}

With this key you can pass several options to \tikzset. Some examples are listed in the next section. It is very important to put the options of tikzsetting in brackets.

apptotikzsetting default={}

With this key you can add several options to tikzsetting. This key based on the idea of manipulation of predefined keys of mdframed. The package mdframed defines via \tikzset the following keys to draw frames.

- \tikzset{mdfbox/.style}
- \tikzset{mdfccorners/.style}
- \tikzset{mdfbackground/.style}
- \tikzset{mdfinnerline/.style}
- \tikzset{mdfoutertline/.style}
- \tikzset{mdfmiddleline/.style}
- \tikzset{mdfframetitlerule/.style}
- \tikzset{mdfframetitlebackground/.style}
- \tikzset{mdfshadow/.style}

Before you change one please have a look at the file md-frame-1.mdf to see the settings.

6.14. PSTricks options

pstrickssetting default={}

With this key you can pass several options to \psset. 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.

pstricksappsetting default={}

mdframed works with defined styles for the different elements. By using \addtopsstyle in combination with this option you can expand the definition. The predefined styles are

- mdfbackgroundstyle
- mdfframetitlebackgroundstyle
- mdfoutertlinestyle
- mdfinnerlinestyle
- mdfmiddlelinestyle

Before you change one please have a look at the file md-frame-2.mdf to see the settings.
7. Hooks and Bools

The following options and bool flags can be used by the any user. Of course some needs more experience than other.

**settings**  
default={}  
This option allows the user to commit some macros at the beginning of \texttt{mdframed}. The given material is executed before the savebox starts.

**extra**  
default={}  
Add material to every drawn frame.

**singleextra**  
default={}  
With this key you can put extra material to the drawing environment of \texttt{mdframed} only for a non splitted frame.

**firstextra**  
default={}  
With this key you can put extra material to the drawing environment of \texttt{mdframed} only for the first part of the splitted frame.

**middleextra**  
default={}  
With this key you can put extra material to the drawing environment of \texttt{mdframed} only for the middle part of the splitted frame.  
This works only with \texttt{framemethod=TikZ and PSTricks}.

**secondextra**  
default={}  
With this key you can put extra material to the drawing environment of \texttt{mdframed} only for the second part of the splitted frame.

After you can add material to any part of the frame you can also detect which part of the frame is drawn. Therefor the bool flags are defined which can be test by \texttt{\ifbool{boolflag}}. All flags are set to true before the output of the content occurs.

**mdfsingleframe**  
default=false  
This bool is only true for a non splitting frame.

**mdffirstframe**  
default=false  
This bool is only for the first part of the frame true.

**mdfmiddleframe**  
default=false  
see above.

**mdflastframe**  
default=false  
see above.

For the advanced users there are also some other hooks which can be used to manipulate the output:

**beforesingleframe**  
default={}  
Every given code to this option is executed before a single frame is is printed.

**aftersingleframe**  
default={}  
Every given code to this option is executed after a single frame is is printed.

**beforebreak**  
default={}  
The value of this option is only executed at breakable frames. Related to the introduction the first and middle frame can be manipulated.

**afterbreak**  
default={}  

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8. Theorems

The value of this option is only executed at breakable frames. Related to the introduction the first and middle frame can be manipulated.

```latex
beforelastframe\default={}
```

The option is executed only for the last frame of a splitted frame.

```latex
afterlastframe\default={}
```

The option is executed only for the last frame of a splitted frame.

```latex
startcode\default={}
```

Every code given to this option is executed at the beginning of the environment.

```latex
startinnercode\default={}
```

This option is executed at the beginning of the save box.

```latex
endinnercode\default={}
```

This option is executed at the end of the save box.

```latex
endcode\default={}
```

The code is executed at the end of the environment.

## 8. Theorems

In this section is described which commands can help you to define theorem environments with `mdframed`.

```latex
\newmdtheoremenv
```

Since the package is often used to highlight theorem environments, the package provides a command to simplify this process. The command has the following syntax:

```latex
\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:

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

So far there is no `\renewmdtheoremenv`!

### \mdtheorem

This is a special kind of `\newtheorem`. The command has the following syntax.

```latex
\mdtheorem[<mdframed−options>]{<envname>}%
[<numberedlike>]{<caption>}[<within>]
```

As you can see the arguments are equal to `\newtheorem` but the command ignores every `\theoremstyle`. This is based on the following behavior.
The command \texttt{mdtheorem} creates two environments based on the given first mandatory argument. The first environment is named like the given argument and creates a numbered theorem. The second environment is named like the first mandatory argument with a star. This environment has the same formatting but isn’t numbered.

The syntax of the new defined environments is equal to the normal theorem environments.

\begin{environment}[optional title]
...
\end{environment}

What happened? The caption of the command will be set as the frame title. In this way all options of the frame title are available. Furthermore \texttt{mdframed} provides additional options explained below.

\texttt{theoremseparator \quad default=\{\}}

Sets the separator of the caption and the title of the theorem. The \texttt{theoremseparator} will be printed only if an theorem title is given.

\texttt{theoremtitlefont \quad default=\{\}}

Via the option \texttt{frametitlefont} you can manipulate the font of the frame title. The option \texttt{theoremttitlefont} allows to set a different font to the title of the theorem.

\texttt{theoremspace \quad default=\space}

Sets the space after \texttt{theoremseparator}.

Examples can be found in the attached files.

9. complexe example – Matlab Terminal

The following example was inspiered by a question on TeX.SX.

Command Window

```plaintext
% >> help sin
% sin  Sine of argument in radians.
% sin(X) is the sine of the elements of X.
% See also asin, sind.
% Overloaded methods:
% sdpvar/sin
% codistributed/sin
% gpuArray/sin
% Reference page in Help browser
% doc sin
```

The code for this result is:

\begin{definecolor}{DarkBlue}{rgb}{.11,.23,.60}
\begin{mddefinestyle}{commandline}\%
\{leftmargin=5pt, rightmargin=10pt,innerleftmargin=15pt,
middlelinewidth=2pt,
frametitlerule=false,
\end{definecolor}
10. Examples

I outsource the examples in four files documentation. The files are

**mdframed-example-default**
Demonstration of examples created with framemethod=default.

**mdframed-example-tikz**
Demonstration of examples created with framemethod=TikZ.

**mdframed-example-pstricks**
Demonstration of examples created with framemethod=pstricks.

**mdframed-example-texsx**
Demonstration of examples like interaction with listings

The examples are often not equivalent but normally they can be adapted to another method. So I really recommend to have a look to all example files.

The Korean TEXGroup created a very nice presentation. I want to show the link because it’s really a great work: kts 2012 mdframed.
In this document I collect various examples for `framemethod=default`. Some presented examples are more or less exorbitant.

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### 1 Loading

In the preamble only the package `mdframed` with the option `framemethod=default` is loaded. All other modifications will be done by \mdfdefinestyle or \mdfsetup.

**Note**

Every \texttt{global} inside the examples is necessary to work with my own created environment `tltxmdfexample*`.

### 2 Examples

All examples have the following settings:

```latex
\mdfsetup{skipabove=\topskip,skipbelow=\topskip}
\newrobustcmd{\ExampleText}{%
  An \texttt{inhomogeneous linear} differential equation has the form
  \begin{align}
  L[v] &= f,
  \end{align}
  where $L$ is a linear differential operator, $v$ is the dependent variable, and $f$ is a given non-zero function of the independent variables alone.
}
```
An inhomogeneous linear differential equation has the form

$$L[v] = f,$$  \hfill (1)

where $L$ is a linear differential operator, $v$ is the dependent variable, and $f$ is a given non-zero function of the independent variables alone.

Example 2 – hidden line + frame title

Inhomogeneous linear

An inhomogeneous linear differential equation has the form

$$L[v] = f,$$  \hfill (2)

where $L$ is a linear differential operator, $v$ is the dependent variable, and $f$ is a given non-zero function of the independent variables alone.

Example 3 – colored frame title
Inhomogeneous linear

An inhomogeneous linear differential equation has the form

\[ L[v] = f, \]  \hspace{1cm} (3)

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.

Example 5 – Theorem environments

\begin{mdframed}[userdefinedwidth=6cm,align=center, \hspace{1cm} \textcolor{blue}{\textit{linecolor=blue,linewidth=4pt}}]
\textit{CTAN lion drawing by Duane Bibby; thanks to \url{www.ctan.org}}
\IfFileExists{ctan\_lion.png}{}{\rule{\linewidth}{4cm}}
\end{mdframed}
Definition 1

An *inhomogeneous linear* differential equation has the form

\[ L[v] = f, \quad (4) \]

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.

Definition 2: Inhomogeneous linear

An *inhomogeneous linear* differential equation has the form

\[ L[v] = f, \quad (5) \]

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.

Definition: Inhomogeneous linear

An *inhomogeneous linear* differential equation has the form

\[ L[v] = f, \quad (6) \]

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.

Example 6 – theorem with separate header and the help of TikZ (complex)
Theorem 1: Inhomogeneous Linear

An \textit{inhomogeneous linear} differential equation has the form

\[ L[v] = f, \]

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.

Theorem 2

An \textit{inhomogeneous linear} differential equation has the form

\[ L[v] = f, \]

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.

Example 7 – hide only a part of a line

The example below is inspired by the following post on StackExchange \textit{Theorem decorations that stay with theorem environment}
An inhomogeneous linear differential equation has the form

\[ L[v] = f, \quad (9) \]

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.

An inhomogeneous linear differential equation has the form

\[ L[v] = f, \quad (10) \]

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.
The \texttt{mdframed} package

Examples for \texttt{framemethod=TikZ}

Marco Daniel 1.9b 2013/07/01

In this document I collect various examples for \texttt{framemethod=TikZ}. Some presented examples are more or less exorbitant.

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1 Loading

In the preamble only the package \texttt{mdframed} with the option \texttt{framemethod=TikZ} is loaded. All other modifications will be done by \texttt{\mdfdefinestyle} or \texttt{\mdfsetup}.

Note
Every \texttt{\global} inside the examples is necessary to work with my own created environment \texttt{tltxmdfexample*}.

2 Examples

All examples have the following settings:

\begin{exampletext}
An \textit{inhomogeneous linear} differential equation has the form
\begin{align}
L[v] &= f,
\end{align}
where $L$ is a linear differential operator, $v$ is the dependent variable, and $f$ is a given non–zero function of the independent variables alone.
\end{exampletext}
Example 1 – round corner

\begin{mdframed}[style=exampledefault]
ExampleText
\end{mdframed}

An *inhomogeneous linear* differential equation has the form

\[ L[v] = f, \]  \hspace{1cm} (1)

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.

Example 2 – hidden line + frame title

\begin{mdframed}[style=exampledefault,frametitle={Inhomogeneous linear}]
ExampleText
\end{mdframed}

Inhomogeneous linear

An *inhomogeneous linear* differential equation has the form

\[ L[v] = f, \]  \hspace{1cm} (2)

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.

Example 3 – framed picture which is centered

\begin{mdframed}[userdefinedwidth=6cm,align=center, linecolor=blue,middlelinewidth=4pt,roundcorner=5pt]
\textit{CTAN lion drawing by Duane Bibby; thanks to \url{www.ctan.org}}
\IfFileExists{ctan-lion.png}{\includegraphics[width=\linewidth]{ctan-lion.png}}{2013/07/01 revision: 212 mdframed-example-tikz}
An *inhomogeneous linear* differential equation has the form

\[ L[v] = f, \]  

(3)

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.
Example 5 – complex example with TikZ

\begin{mdframed}[style=exercisestyle]
\text{ExampleText}
\end{mdframed}

\begin{mdframed}[style=exercisestyle, exercisepoints=10]
\text{ExampleText}
\end{mdframed}
Exercise n1

An *inhomogeneous linear* differential equation has the form

\[ L[v] = f, \]  

(4)

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.

Exercise n2

An *inhomogeneous linear* differential equation has the form

\[ L[v] = f, \]  

(5)

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.
Example 6 – Theorem environments

\mdfdefinestyle{theoremstyle}{%  
  linewidth=2pt,  
  frametitlecolor=green!50,  
  frametitleulewidth=1pt,  
  innertopmargin=\topskip,  
  }  
\mddefinestyle{definition}{Definition}  
\begin{definition}[Inhomogeneous linear]  
\ExampleText  
\end{definition}  
\begin{definition}[Inhomogeneous linear]  
\ExampleText  
\end{definition}

\textbf{Definition 1: Inhomogeneous linear}

An \textit{inhomogeneous linear} differential equation has the form  
\[ L[v] = f, \tag{6} \]

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.

\textbf{Definition: Inhomogeneous linear}

An \textit{inhomogeneous linear} differential equation has the form  
\[ L[v] = f, \tag{7} \]

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.
The mdframed package

Examples for framemethod=tikz

Marco Daniel 1.9b 2013/07/01

In this document I collect various examples for framemethod=tikz. Some presented examples are more or less exorbitant.

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1 Loading

In the preamble only the package mdframed width the option framemethod=tikz is loaded. All other modifications will be done by \mdfdefinestyle or \mdfsetup.

Note

Every \global inside the examples is necessary to work with my own created environment tltxmdfexample*.

2 Examples

All examples have the following settings:

\mdfsetup{skipabove=\topskip,skipbelow=\topskip}
\newrobustcmd\ExampleText{%
  An \textit{inhomogeneous linear} differential equation has the form
  \begin{align}
  \mathcal{L}[v] &= f,
  \end{align}
  where $\mathcal{L}$ is a linear differential operator, $v$ is the dependent variable, and $f$ is a given non-zero function of the independent variables alone.
}
Example 1 – Package listings

The example below is inspired by the following post on StackExchange Background overflows when using rounded corners for listings (package: ‘listings’)

Here the solution which can be decorate as usual.

\begin{BeforeBeginEnvironment}[l]{lstlisting}{%
  \begin{mdframed} [<modification>]
  \vspace{-0.7em}}
\end{BeforeBeginEnvironment}[l]{lstlisting}{%
  \vspace{-0.5em}}

With the new command \texttt{\textbackslash surroundwithmdframed} you can use

\begin{surroundwithmdframed}{listings}
Example 2 – Package multicol

How I wrote in “Known Problems” you can’t combine \texttt{multicol} with \texttt{mdframed}. In a simple way without any breaks you can use:

\begin{verbatim}
begin{multicols}{2}
lipsum[1]
begin{mdframed}
ExampleText
end{mdframed}
lipsum[2]
end{multicols}
\end{verbatim}


An inhomogeneous linear differential equation has the form

\[ L[v] = f, \quad (1) \]

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.


An inhomogeneous linear differential equation has the form

\[ L[v] = f, \]  

(2)

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.
Example 4 – Working inside enumerate

Example 4 – Working inside enumerate

\begin{enumerate}
\item in the following \ldots
\begin{mdframed}[linecolor=blue,middlelinewidth=2]
\text{Example}Text
\end{mdframed}
\item \text{lipsum}[2]
\end{enumerate}

1. in the following \ldots

An inhomogeneous linear differential equation has the form

\[ L[v] = f, \]

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.


Example 5 – Position a specific symbol at a line

\tikzset
\{warningsymbol/.style={
rectangle, draw=red,
fill=white, scale=1,
overlay}\}
\mdfdefinestyle{warning}{%hidealllines=true,leftline=true,
skipabove=12,skipbelow=12pt,
innterompargin=0.4em, %innerbottommargin=0.4em, %innerrightmargin=0.7em, %rightmargin=0.7em, %innerleftmargin=1.7em, %leftmargin=0.7em, %
\}
An inhomogeneous linear differential equation has the form

$$L[v] = f,$$

(4)

where $L$ is a linear differential operator, $v$ is the dependent variable, and $f$ is a given non-zero function of the independent variables alone.

Example 6 – digression-environement inspired by Tobias Weh
An *inhomogeneous linear* differential equation has the form

\[ L[v] = f, \]

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.
Theorem 1: Inhomogeneous linear

An *inhomogeneous linear* differential equation has the form

\[ L[v] = f, \tag{6} \]

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.
1 Loading

In the preamble only the package \texttt{mdframed} width the option \texttt{framemethod=PSTricks} is loaded. All other modifications will be done by \texttt{\mdfdefinestyle} or \texttt{\mdfsetup}.

\textbf{Note}

Every \texttt{global} inside the examples is necessary to work with my own created environment \texttt{tltxmdfexample*}.

2 Examples

All examples have the following settings:

\begin{quote}
\begin{verbatim}
\mdfsetup{skipabove=\topskip,skipbelow=\topskip}
\newrobustcmd\ExampleText{\%
  \textit{An} inhomogeneous linear differential equation has the form
  \begin{align}
  L[v] = f,
  \end{align}
  where $L$ is a linear differential operator, $v$ is the dependent variable, and $f$ is a given non-zero function of the independent variables alone.
}\end{verbatim}
\end{quote}
Example 1 – very simple

\begin{mdframed}[style=exampledefault,roundcorner=5]
Example Text
\end{mdframed}

An \textit{inhomogeneous linear} differential equation has the form

\[ L[v] = f, \]  \hspace{1cm} \text{(1)}

where $L$ is a linear differential operator, $v$ is the dependent variable, and $f$ is a given non-zero function of the independent variables alone.

Example 2 – hidden line + frame title

\begin{mdframed}[style=exampledefault,frametitle={Inhomogeneous linear}]
Example Text
\end{mdframed}

Inhomogeneous linear

An \textit{inhomogeneous linear} differential equation has the form

\[ L[v] = f, \]  \hspace{1cm} \text{(2)}

where $L$ is a linear differential operator, $v$ is the dependent variable, and $f$ is a given non-zero function of the independent variables alone.

Example 3 – Dash Lines

[morekeywords=pstrickssetting,linestyle,dashed]

\begin{mdframed}[exampledefault]{%
An *inhomogeneous linear* differential equation has the form

\[ L[v] = f, \tag{3} \]

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.

Example 4 – Double Lines

\begin{mdframed}[style=exampledefault]
Example Text
\end{mdframed}

An *inhomogeneous linear* differential equation has the form

\[ L[v] = f, \tag{4} \]

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.

Example 5 – Shadow frame

\begin{myshadowbox}

\frametitle{Inhomogeneous linear}

Example Text

\end{myshadowbox}
An inhomogeneous linear differential equation has the form

\[ L[v] = f, \quad (5) \]

where \( L \) is a linear differential operator, \( v \) is the dependent variable, and \( f \) is a given non-zero function of the independent variables alone.
11. Errors, Warnings and Messages

The package \texttt{mdframed} provides different errors, warnings and messages in the \texttt{log}-file. Some \LaTeX-editors like TEXMaker or TEXStudio have a special tab for errors and warnings but not for messages. So you should look in the \texttt{log-File} itself.

The following errors and warnings are generated by \texttt{mdframed}.

The package \ldots does not exist but needed by \texttt{mdframed}

To avoid this problem you should install the required packages which are listed in section 2.

package option \texttt{style} is depreciated
use \texttt{framemethod} instead \texttt{style}

With version 0.9d \texttt{mdframed} changed the meaning of the option \texttt{style}. The option is used to load a defined style by \texttt{\mdfdefinestyle}. Instead use \texttt{framemethod} (see section 6.1).

Unknown \texttt{framemethod} .... \texttt{mdframed}

The input string for the option \texttt{framemethod} is unkown. See section 6.1.

You have not loaded \texttt{ntheorem} yet

To use the option \texttt{ntheorem} you have to load the package \texttt{ntheorem}.

You have only a width of 3cm

The package \texttt{mdframed} calculates the width of the contents based on the given options. If the width of the contents is smaller than 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 \texttt{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 \texttt{\clearpage} in front of the environment \texttt{mdframed}. So far I have no idea how to avoid such things.

You got a bad break
because the split box is empty
You have to change the page \texttt{settings}
like enlargethispage or something else
You got a bad break
See the explanation above.
You got a bad break
because the last split 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.

12. Known Limitations

In this section I will collect known issues. In case you encounter any further problems, please drop me an email, marco.daniel at 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. If you load the package picins the frame will no be splitted. That based on a problem of the package ‘picins’ which defines \@captype global. To work with the package picins you can use the following hack.

\usepackage{picins}
\makeatletter
\let\@captype\@undefined
\def\newcaption{%
\begingroup%
\def\@captype{figure}%
\refstepcounter{\@captype}\
endgroup%
%
\makeatother

3. mdframed can’t handle the option allowframebreaks of the class beamer.

4. A nested mdframed environment can’t be splitted.

13. ToDo

It is important to update the documentation
1. see “Known Problems”.

2. So far it isn’t possible to combine the environment \begin{multicols} of the package multicol with mdframed with the whole option list.
3. Create new styles.

4. Improve page breaks.

5. Improve footnotes.

6. Improve documentation and examples.

7. Create styles for \texttt{frametitle}.

8. Create an inline version of \texttt{mdframed} that’s works like \texttt{fbox}

9. Add \texttt{ht\strutbox} to file \texttt{md-frame-1.mdf}

### 14. Acknowledgements

Dick Nickalls; Dietrich Grau; Piazza Luca; Jobst Hoffmann; Martin Scharrer; Enrico Gregorio; Heiko Oberdiek; Philipp Stephani.

Thanks for proofreading

Alan Munn and Nahid Shajari

I hope I forgot nobody.
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 \mdf@splitbox@one. After the calculation of the width and the height of the \mdf@splitbox@one (done by mdframed.sty) the box will be set sequently (done by md-frame-X.mdf). The following figure demonstrates this.

![Diagram](image)

The width of the contents is the result of the settings of leftmargin, rightmargin, linewidth, innerleftmargin and innerrightmargin (see figure (2)).

A.2. The Framecommands

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

\mdf@putbox@single This command sets the contents of a single unsplit frame.
A.2. The Framecommands

\mdfputbox\firstcommand  This command sets the contents of the first frame of a split frame.

\mdfputbox\middlecommand  This command sets the contents of the middle frame of a split frame.

\mdfputbox\secondcommand  This command sets the contents of the last frame of a split frame.

Using the explained commands we give an example. The command \box uses 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\mdfputbox\single{\box\mdf\splitbox\one}
\makeatother

I am using the command \leftline to start the ”Framecommands” at the left.

\makeatletter
\def\mdfputbox\single{\leftline{\box\mdf\splitbox\one}}
\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 \mdfputbox\single as follows

\makeatletter
\def\mdfputbox\single{%
  \leftline{%
    \hspace{\mdf@leftmargin@length}\
    \rule{\mdf@linewidth}{\ht\mdf@splitbox\one+\dp\mdf@splitbox\one}\
    \box\mdf@splitbox\one
  }
}
\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 framemethod to load the file by setting framemethod=X.