The library is loaded by a package option or inside the preamble by:

可以通过使用包选项或在导言区内加载来加载该库：

```
\tcbuselibrary{theorems}
```

This also loads the package amsmath.

这也会加载包 amsmath。

18.1　Macros of the Library
　　　库中的宏

\newtcbtheorem[⟨*init options*⟩]{⟨*name*⟩}{⟨*display name*⟩}{⟨*options*⟩}{⟨*prefix*⟩}

Creates new environments ⟨*name*⟩ and ⟨*name*⟩* based on tcolorbox to frame a (mathematical) theorem. The ⟨*display name*⟩ is used in the title line with a number, e.g. «Theorem 5.1». The ⟨*options*⟩ are given to the underlying tcolorbox to control the appearance. The ⟨*init options*⟩ allow setting up automatic numbering, see **??** on page ??.
创建基于tcolorbox 的新环境 ⟨*name*⟩ 和 ⟨*name*⟩来框定（数学）定理。在标题行中使用 ⟨*display name*⟩ 和一个编号，例如« 定理 5.1»。⟨*options*⟩ 用于控制外观的底层tcolorbox。⟨*counter*⟩ 用于自动编号。⟨*init options*⟩ 允许设置自动编号，参见**??** on page ??。

The new environment ⟨*name*⟩ takes one optional and two mandatory parameters. The optional parameter supplements the options and should be used only in rare cases. The first mandatory parameter is the title text for the theorem and is also set as **/tcb/nameref**[→P.??] identifier. The second mandatory parameter is a ⟨*marker*⟩. The theorem is automatically labeled with ⟨*prefix*⟩⟨*separator*⟩⟨*marker*⟩ where ⟨*separator*⟩ is predefined as ":", see **/tcb/label separator**[→P.9].
新环境 ⟨*name*⟩ 具有一个可选参数和两个强制参数。可选参数补充选项，仅在极少数情况下使用。第一个强制参数是定理的标题文本，也设置为 **/tcb/nameref**[→P.??] 标识符。第二个强制参数是一个 ⟨*marker*⟩。定理自动标记为 ⟨*prefix*⟩⟨*separator*⟩⟨*marker*⟩，其中 ⟨*separator*⟩ 预定义为 ":"，请参见 **/tcb/label separator**[→P.9]。

The new environment ⟨*name*⟩* takes one optional and one mandatory parameter and represents an unnumbered variant of the environment ⟨*name*⟩. This variant is not labeled and not listed in lists of theorems.
新环境 ⟨*name*⟩* 具有一个可选参数和一个强制参数，表示环境 ⟨*name*⟩ 的未编号变体。此变体未标记，并且不在定理列表中列出。

> 导言中的定义:
>
> ```
> \newtcbtheorem[number within=section]{mytheo}{My Theorem}%
>   {colback=green!5,colframe=green!35!black,fonttitle=\bfseries}{th}
> ```

```
% usage of `\nameref' needs `nameref' or `hyperref' to be loaded
\begin{mytheo}{This is my title}{theoexample}
This is the text of the theorem. The counter is automatically assigned and,
in this example, prefixed with the section number. This theorem is numbered with
\ref{th:theoexample}, it is given on page~\pageref{th:theoexample},
and it is titled \flqq\nameref{th:theoexample}\frqq.

这是定理的文本。计数器会自动分配，并在本例中带有章节编号前缀。此定理编号为%
\ref{th:theoexample}，在第\pageref{th:theoexample}页给出，并以%
\flqq\nameref{th:theoexample}\frqq 为标题。
\end{mytheo}
```

> **My Theorem 18.1: This is my title**
>
> This is the text of the theorem. The counter is automatically assigned and, in this example, prefixed with the section number. This theorem is numbered with 18.1, it is given on page 2, and it is titled «This is my title».
> 这是定理的文本。计数器会自动分配，并在本例中带有章节编号前缀。此定理编号为18.1，在第2页给出，并以 «This is my title» 为标题。

```
\begin{mytheo}[label=myownlabel]{This is my title}{}
The label parameter can be left empty without \LaTeX\ error.
Or you may use an own label to reference Theorem \ref{myownlabel}.

标签参数可以为空，不会发生 \LaTeX\ 错误。 或者您可以使用自己的标签来引用定理 ↩
    ↪\ref{myownlabel}。
\end{mytheo}
```

> **My Theorem 18.2: This is my title**
>
> The label parameter can be left empty without LaTeX error. Or you may use an own label to reference Theorem 18.2.
> 标签参数可以为空，不会发生 LaTeX 错误。或者您可以使用自己的标签来引用定理 18.2。

```
\begin{mytheo}{}{}
The title can also be left empty without problem. Note that the \enquote{:}
vanished magically.

标题也可以为空，没有问题。注意 \enquote{:} 神奇地消失了。
\end{mytheo}
```

> **My Theorem 18.3**
>
> The title can also be left empty without problem. Note that the ":" vanished magically.
> 标题也可以为空，没有问题。注意 ":" 神奇地消失了。

```
\begin{mytheo*}{Unnumbered Theorem}
This theorem is not numbered.

这个定理没有编号。
\end{mytheo*}
```

> **My Theorem: Unnumbered Theorem**
>
> This theorem is not numbered.
> 这个定理没有编号。

```
\begin{mytheo*}{}
This theorem has no number and no title.

这个定理既没有编号也没有标题。
\end{mytheo*}
```

> **My Theorem**
>
> This theorem has no number and no title.
> 这个定理既没有编号也没有标题。

> **!** To switch off the `nameref` feature permanently, add `nameref/.style={}` inside the ⟨*options*⟩ list.
> 要永久关闭 `nameref` 功能，请在 ⟨*options*⟩ 列表中添加`nameref/.style=`。

\renewtcbtheorem[⟨*init options*⟩]{⟨*name*⟩}{⟨*display name*⟩}{⟨*options*⟩}{⟨*prefix*⟩}

Operates like **\newtcbtheorem**$^{\rightarrow P.1}$, but based on \renewenvironment instead of \newenvironment. An existing environment is redefined.

与 **\newtcbtheorem**$^{\rightarrow P.1}$ 类似，但基于 \renewenvironment 而不是 \newenvironment 进行操作。重新定义现有的环境。

\tcboxmath[⟨*options*⟩]{⟨*mathematical box content*⟩}

Creates a **tcolorbox**$^{\rightarrow P.??}$ which is fitted to the width of the given ⟨*mathematical box content*⟩. This box is intended to be applied as part of a larger formula and may be used as replacement for the \boxed macro of amsmath.

创建一个 **tcolorbox**$^{\rightarrow P.??}$，该盒子适合给定的 ⟨*mathematical box content*⟩ 的宽度。此框旨在作为较大公式的一部分应用，并可用作amsmath 的\boxed 宏的替换。

```
\begin{equation}
\tcbset{fonttitle=\scriptsize}
\tcboxmath[colback=LightBlue!25!white,colframe=blue]{ a^2 = 16 }
\quad \Rightarrow \quad
\tcboxmath[colback=Salmon!25!white,colframe=red,title=Implication]%
  { a = 4 ~\vee~ a=-4. }
\end{equation}
```

$$
\boxed{a^2 = 16} \quad \Rightarrow \quad \boxed{a = 4 \ \vee \ a = -4.} \tag{1}
$$

\tcbhighmath[⟨*options*⟩]{⟨*mathematical box content*⟩}

This is a special case of the **\tcboxmath** macro which uses the style

3

/tcb/highlight math$^{\rightarrow\,\mathrm{P.\,14}}$. It is intended to provide context sensitive highlighting of formula parts. The color settings via **/tcb/highlight math style**$^{\rightarrow\,\mathrm{P.\,14}}$ may be different inside theorems or other colored areas and outside.

这是 **\tcboxmath**$^{\rightarrow\,\mathrm{P.\,3}}$宏的一个特殊情况，它使用了样式 **/tcb/highlight math**$^{\rightarrow\,\mathrm{P.\,14}}$。它旨在提供上下文敏感的公式部分高亮。通过 **/tcb/highlight math style**$^{\rightarrow\,\mathrm{P.\,14}}$的颜色设置可以在定理或其他彩色区域内外不同。

```
\tcbset{myformula/.style={colback=yellow!10!white,colframe=red!50!black,
  every box/.style={highlight math style={colback=LightBlue!50!white,colframe=Navy}}
  }}

\begin{align}
  \tcbhighmath{\sum\limits_{n=1}^{\infty} \frac{1}{n}} &= \infty.\\
  \int x^2 ~\text{d}x                        &= \frac13 x^3 + c.
\end{align}

\begin{tcolorbox}[ams align,myformula]
  \tcbhighmath{\sum\limits_{n=1}^{\infty} \frac{1}{n}} &= \infty.\\
  \int x^2 ~\text{d}x                        &= \frac13 x^3 + c.
\end{tcolorbox}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \tag{2}$$

$$\int x^2 \ \mathrm{d}x = \frac{1}{3}x^3 + c. \tag{3}$$

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \tag{4}$$

$$\int x^2 \ \mathrm{d}x = \frac{1}{3}x^3 + c. \tag{5}$$

\tcbhighmath$^{\rightarrow\,\mathrm{P.\,3}}$ can be used in symbiosis with the `empheq` package which allows to specify own boxing commands to mark multiline formulas.

\tcbhighmath$^{\rightarrow\,\mathrm{P.\,3}}$ 可以与 `empheq` 宏包共同使用，该宏包允许指定自己的盒子命令来标记多行公式。

```
% \usepackage{empheq}
\begin{empheq}[box=\tcbhighmath]{align}
a&=\sin(z)\\
E&=mc^2 + \int_a^b x\, dx
\end{empheq}

\tcbset{highlight math style={enhanced,
  colframe=red!60!black,colback=yellow!50!white,arc=4pt,boxrule=1pt,
  drop fuzzy shadow}}

\begin{empheq}[box=\tcbhighmath]{align}
a&=\sin(z)\\
E&=mc^2 + \int_a^b x\, dx
\end{empheq}
```

$$a = \sin(z) \tag{6}$$
$$E = mc^2 + \int_a^b x\, dx \tag{7}$$

$$a = \sin(z) \tag{8}$$
$$E = mc^2 + \int_a^b x\, dx \tag{9}$$

Besides $\textbf{\textbackslash tcbhighmath}^{\rightarrow\,\text{P.3}}$, one can easily define an independent new box based on $\textbf{\textbackslash tcbox}^{\rightarrow\,\text{P.??}}$ which acts like $\textbf{\textbackslash tcbhighmath}^{\rightarrow\,\text{P.3}}$:

除了 $\textbf{\textbackslash tcbhighmath}^{\rightarrow\,\text{P.3}}$，我们可以轻松地基于 $\textbf{\textbackslash tcbox}^{\rightarrow\,\text{P.??}}$ 定义一个独立的新盒子，它的行为类似于 $\textbf{\textbackslash tcbhighmath}^{\rightarrow\,\text{P.3}}$：

```
% \usepackage{empheq}
\newtcbox{\otherbox}[1][]{nobeforeafter,math upper,tcbox raise base,
  enhanced,frame hidden,boxrule=0pt,interior style={top color=green!10!white,
  bottom color=green!10!white,middle color=green!50!yellow},
  fuzzy halo=1pt with green,#1}

\begin{empheq}[box=\otherbox]{align}
a&=\sin(z)\\
E&=mc^2 + \int_a^b x\, dx
\end{empheq}

\begin{equation}
\tcbhighmath{E} = \otherbox{mc^2}
\end{equation}
```

$$a = \sin(z) \tag{10}$$
$$E = mc^2 + \int_a^b x\, dx \tag{11}$$

$$E = mc^2 \tag{12}$$

18.2 Option Keys of the Library
库的选项键

The given ⟨*sign*⟩ is used inside the title text of a theorem as separater between display name combined with number and the specific title text. It is omitted, if there is no specific title text.

在定理的标题文本中，给定的 ⟨*sign*⟩ 用作显示名称和编号与特定标题文本之间的分隔符。如果没有特定的标题文本，则省略它。

```
% \usepackage{amssymb}
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
  {colback=white,colframe=red!50!black,fonttitle=\bfseries,
   separator sign={\ $\blacktriangleright$}}{theo}
\begin{sometheorem}{我的例子}{}
我的定理文本。
\end{sometheorem}
```

> **定理 18.4 ▶ 我的例子**
>
> 我的定理文本。

/tcb/separator sign colon   (style, no value, initially set)

Sets **/tcb/separator sign**^{→P. 5} to the default colon : sign.
将 **/tcb/separator sign**^{→P. 5}设置为默认的冒号：符号。

/tcb/separator sign dash   (style, no value)

Sets **/tcb/separator sign**^{→P. 5} to an en-dash sign.
将 **/tcb/separator sign**^{→P. 5}设置为一个破折号符号。

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
  {colback=white,colframe=red!50!black,fonttitle=\bfseries,
   separator sign dash}{theo}
\begin{sometheorem}{我的例子}{}
我的定理文本。
\end{sometheorem}
```

> **定理 18.5 – 我的例子**
>
> 我的定理文本。

/tcb/separator sign none   (style, no value)

Sets **/tcb/separator sign**^{→P. 5} to empty.
将 **/tcb/separator sign**^{→P. 5}的集合设置为空。

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
  {colback=white,colframe=red!50!black,fonttitle=\bfseries,
   separator sign none}{theo}
\begin{sometheorem}{我的例子}{}
我的定理文本。
\end{sometheorem}
```

> **定理 18.6 我的例子**
>
> 我的定理文本。

/tcb/description delimiters={⟨*left*⟩}{⟨*right*⟩}   (no default, initially empty)

The given ⟨*left*⟩ and ⟨*right*⟩ delimiter signs are used to frame the descriptive title text of a theorem.

给定的 ⟨*left*⟩ 和 ⟨*right*⟩ 分隔符号用于框定定理的描述性标题文本。

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
  {colback=white,colframe=red!50!black,fonttitle=\bfseries,
   description delimiters={\flqq}{\frqq}}{theo}
\begin{sometheorem}{我的例子}{}
我的定理文本。
\end{sometheorem}
```

定理 18.7: « 我的例子 »

我的定理文本。

`/tcb/description delimiters parenthesis`   (style, no value)

Sets **/tcb/description delimiters**$^{→P.6}$ to (and).

将 **/tcb/description delimiters**$^{→P.6}$ 设置为（ 和 ）。

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
  {colback=white,colframe=red!50!black,fonttitle=\bfseries,
   description delimiters parenthesis}{theo}
\begin{sometheorem}{我的例子}{}
我的定理文本。
\end{sometheorem}
```

定理 18.8: (我的例子)

我的定理文本。

`/tcb/description delimiters none`   (style, no value, initially set)

Sets **/tcb/description delimiters**$^{→P.6}$ to the default empty texts.

将 **/tcb/description delimiters**$^{→P.6}$ 设置为默认的空文本。

`/tcb/description color=`⟨*color*⟩   (default empty, initially empty)

Sets the ⟨*color*⟩ of the descriptive title text deviating from **/tcb/coltitle**$^{→P.??}$. The color is reset to **/tcb/coltitle**$^{→P.??}$, if `description color` is used without value.

设置与 **/tcb/coltitle**$^{→P.??}$ 不同的描述标题文本的 ⟨*color*⟩。如果使用不带值的 `description color`，则颜色将重置为 **/tcb/coltitle**$^{→P.??}$。

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
  {colback=white,colframe=red!50!black,fonttitle=\bfseries,
   description color=red!25!yellow}{theo}
\begin{sometheorem}{我的例子}{}
我的定理文本。
\end{sometheorem}
```

定理 18.9: 我的例子

我的定理文本。

`/tcb/description font=`⟨*text*⟩   (default empty, initially empty)

Sets ⟨*text*⟩ (e.g. font settings) before the descriptive title text deviating from

/tcb/fonttitle$^{\to P.??}$. The $\langle text \rangle$ is removed, if `description font` is used without value.

在与 **/tcb/fonttitle**$^{\to P.??}$ 不同的描述标题文本之前设置 $\langle text \rangle$（例如字体设置）。如果使用不带值的 `description font`，则会删除 $\langle text \rangle$。

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
  {colback=white,colframe=red!50!black,fonttitle=\bfseries,
   description delimiters={\glqq}{\grqq},
   description font=\mdseries\itshape}{theo}
\begin{sometheorem}{我的例子}{}
我的定理文本。
\end{sometheorem}
```

> **定理 18.10:** „ *我的例子* "
>
> 我的定理文本。

/tcb/description formatter=$\langle macro \rangle$ (default empty, initially empty)

Sets $\langle macro \rangle$ as formatter for the descriptive title text. The $\langle macro \rangle$ has to take one mandatory argument (the description text).

Note that   **/tcb/description delimiters**$^{\to P.6}$,   **/tcb/description color**$^{\to P.7}$, and **/tcb/description font**$^{\to P.7}$ are ignored, if this option is used.

If `description formatter` is used without value, the formatter is reset to its standard behavior.

将 $\langle 宏 \rangle$ 设置为描述标题文本的格式化程序。$\langle 宏 \rangle$ 必须接受一个必需参数（描述文本） 。请注意，如果使用此选项，则忽略   **/tcb/description delimiters**$^{\to P.6}$, **/tcb/description color**$^{\to P.7}$和 **/tcb/description font**$^{\to P.7}$。如果使用`description formatter`而没有值，则格式化程序将重置为其标准行为。

```
\newtcbox{\formbox}{enhanced,frame empty,size=minimal,boxsep=2pt,arc=1pt,
  on line,interior style image=goldshade.png}

\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
  {colback=white,colframe=red!50!black,fonttitle=\bfseries,
   description formatter=\formbox}{theo}
\begin{sometheorem}{我的例子}{}
我的定理文本。
\end{sometheorem}
```

> **定理 18.11:** 我的例子
>
> 我的定理文本。

/tcb/terminator sign=$\langle sign \rangle$ (no default, initially empty)

The given $\langle sign \rangle$ is used as terminator at the end of the title text of a theorem.

给定的 $\langle 符号 \rangle$ 用作定理标题文本末尾的终止符。

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
  {colback=white,colframe=red!50!black,fonttitle=\bfseries,
   terminator sign={.}}{theo}
\begin{sometheorem}{我的例子}{}
我的定理文本。
\end{sometheorem}
```

定理 18.12: 我的例子.

我的定理文本。

/tcb/terminator sign colon   (style, no value, initially set)

Sets **/tcb/terminator sign**[→P.8] to the colon : sign.
将 **/tcb/terminator sign**[→P.8]设置为冒号：符号。

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
  {colback=white,colframe=red!50!black,fonttitle=\bfseries,
   separator sign dash,terminator sign colon}{theo}
\begin{sometheorem}{我的例子}{}
我的定理文本。
\end{sometheorem}
```

定理 18.13 – 我的例子:

我的定理文本。

/tcb/terminator sign dash   (style, no value)

Sets **/tcb/terminator sign**[→P.8] to an en-dash sign.
将 **/tcb/terminator sign**[→P.8]设置为短横线符号。

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
  {colback=white,colframe=red!50!black,fonttitle=\bfseries,
   terminator sign dash}{theo}
\begin{sometheorem}{我的例子}{}
我的定理文本。
\end{sometheorem}
```

定理 18.14: 我的例子 –

我的定理文本。

/tcb/terminator sign none   (style, no value)

Sets **/tcb/terminator sign**[→P.8] to the default empty text.
将 **/tcb/terminator sign**[→P.8]设置为默认的空文本。

N 2016-04-19 **/tcb/label separator**=⟨*separator*⟩   (no default, initially :)

The given ⟨*separator*⟩ is used for labels created with environments which are defined them-
selves by **\newtcbtheorem**[→P.1]. This ⟨*separator*⟩ is put between ⟨*prefix*⟩ (defined by
\newtcbtheorem[→P.1]) and ⟨*marker*⟩ (defined by an actual theorem environment).
给定的 ⟨*separator*⟩ 用于通过 **\newtcbtheorem**[→P.1] 定义的环境创建的标签。这个
⟨*separator*⟩ 被放置在 ⟨*prefix*⟩（由 **\newtcbtheorem**[→P.1] 定义）和 ⟨*marker*⟩（由实际
的定理环境定义）之间。

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
  {colback=white,colframe=red!50!black,fonttitle=\bfseries,
   label separator=*}{theo}
\begin{sometheorem}{我的例子}{myex}
我的定理文本。
\end{sometheorem}
See Example~\ref{theo*myex}.
```

定理 18.15: 我的例子

我的定理文本。

See Example 18.15.

/tcb/theorem full label supplement={⟨*style*⟩}   (no default, initially empty)

The given ⟨*style*⟩ is used in connection with labels created with environments which are defined themselves by **\newtcbtheorem**[→P. 1]. This ⟨*style*⟩ uses one argument which is automatically set to the full label marker of the environment, i.e. a text consisting of ⟨*prefix*⟩ (defined by **\newtcbtheorem**[→P. 1]), **/tcb/label separator**[→P. 9], and ⟨*marker*⟩ (defined by an actual theorem environment).

所给出的 ⟨*style*⟩ 用于与由 **\newtcbtheorem**[→P. 1] 定义的环境创建的标签相关联。这个 ⟨*style*⟩ 使用一个参数，该参数自动设置为环境的完整标签标记，即由 **\newtcbtheorem**[→P. 1] 定义的 ⟨*prefix*⟩、 **/tcb/label separator**[→P. 9] 和实际定理环境定义的 ⟨*marker*⟩ 组成的文本。

```
% The following adds a hyper target to all environments
% created with \newtcbtheorem
% 以下代码将为所有使用 \newtcbtheorem 命令创建的环境添加超链接目标。
\tcbset{theorem full label supplement={hypertarget={#1}}}

\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
   {colback=white,colframe=red!50!black,fonttitle=\bfseries}{theo}
\begin{sometheorem}{我的例子}{myex2}
我的定理文本。
\end{sometheorem}
This automated \hyperlink{theo:myex2}{hyper target can be linked to with a
 hyper link}.

这个自动化的\hyperlink{theo:myex2}{超链接目标}可以通过超链接链接。
```

定理 18.16: 我的例子

我的定理文本。

This automated hyper target can be linked to with a hyper link.
这个自动化的超链接目标可以通过超链接链接。

A second usage of **/tcb/theorem full label supplement** overwrites the first setting.
对 **/tcb/theorem full label supplement**的第二次使用会覆盖第一次的设置。

/tcb/theorem label supplement={⟨*style*⟩}   (no default, initially empty)

The given ⟨*style*⟩ is used in connection with labels created with environments which are defined themselves by **\newtcbtheorem**[→P. 1]. This ⟨*style*⟩ uses one argument which is automatically set to the label ⟨*marker*⟩ defined by an actual theorem environment.

A second usage of **/tcb/theorem label supplement** overwrites the first setting, but **/tcb/theorem full label supplement** and **/tcb/theorem label supplement** can be used independently.

给定的 ⟨*style*⟩ 与使用 \newtcbtheorem[→P. 1]定义的环境创建的标签相关联。这个 ⟨*style*⟩ 使用一个参数，该参数自动设置为实际定理环境定义的标签 ⟨*marker*⟩。第二次使用 /tcb/theorem label supplement会覆盖第一次设置，但 /tcb/theorem full label supplement和 /tcb/theorem label supplement可以独立使用。

```
% `marginnote' has to be loaded
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
   {colback=white,colframe=red!50!black,fonttitle=\bfseries,
    theorem label supplement={hypertarget={XYZ-##1}},
    theorem full label supplement={code={\marginnote{##1}}}
   }{theo}
\begin{sometheorem}{我的例子}{myex3}
我的定理文本。
\end{sometheorem}
This automated \hyperlink{XYZ-myex3}{hyper target can be linked to with a
hyper link}.

此自动化的超链接目标可与超链接链接。
```

> **定理 18.17: 我的例子**
>
> 我的定理文本。

This automated hyper target can be linked to with a hyper link.
此自动化的超链接目标可与超链接链接。

/tcb/theorem hanging indent=auto|⟨*length*⟩   (default **auto**, initially **auto**)

Sets the hanging indent of the theorem title to **auto** or the given ⟨*length*⟩. For **auto**, the hanging indent matches the display name, number and separator sign of the theorem. If ⟨*length*⟩ is negative, the theorem title is indented positively without hanging indent.

将定理标题的悬挂缩进设置为**auto**或给定的 ⟨*length*⟩。对于**auto**，悬挂缩进与定理的显示名称、编号和分隔符匹配。如果 ⟨*length*⟩ 为负数，则定理标题会向正方向缩进而不是悬挂缩进。

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
{colback=white,colframe=red!50!black,fonttitle=\bfseries}{theo}
\begin{sometheorem}{这是一个相当简短且几乎为空的定理的非常长且复杂的标%
题题题题题题题题题题题题题题题题题题题题}{myexA1}
我的定理文本。
\end{sometheorem}
```

> **定理 18.18: 这是一个相当简短且几乎为空的定理的非常长且复杂的标题题题题题题题题题题题题题题题题题题题题**
>
> 我的定理文本。

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```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
{colback=white,colframe=red!50!black,fonttitle=\bfseries}{theo}
\begin{sometheorem}[theorem hanging ↵
      ↳indent=5mm]{这是一个相当简短且几乎为空的定理的非常长且复杂的标%
    题题题题题题题题题题题题题题题题题题题}{myexA2}
我的定理文本。
\end{sometheorem}
```

> **定理 18.19: 这是一个相当简短且几乎为空的定理的非常长且复杂的标题题题题题题题题题题**
> **题题题题题题题题题题题题**
>
> 我的定理文本。

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
{colback=white,colframe=red!50!black,fonttitle=\bfseries}{theo}
\begin{sometheorem}[theorem hanging ↵
      ↳indent=0pt]{这是一个相当简短且几乎为空的定理的非常长且复杂的标%
    题题题题题题题题题题题题题题题题题题题}{myexA3}
我的定理文本。
\end{sometheorem}
```

> **定理 18.20: 这是一个相当简短且几乎为空的定理的非常长且复杂的标题题题题题题题题题题**
> **题题题题题题题题题题题**
>
> 我的定理文本。

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
{colback=white,colframe=red!50!black,fonttitle=\bfseries}{theo}
\begin{sometheorem}[theorem hanging ↵
      ↳indent=-5mm]{这是一个相当简短且几乎为空的定理的非常长且复杂的标%
题题题题题题题题题题题题题题题题题题题}{myexA4}
我的定理文本。
\end{sometheorem}
```

> **定理 18.21: 这是一个相当简短且几乎为空的定理的非常长且复杂的标题题题题题题题**
> **题题题题题题题题题题题题题题**
>
> 我的定理文本。

`/tcb/theorem name and number` (style, no value, initially set)

Prints theorem name followed by theorem number inside the title.
在标题中打印定理名称，后面跟随定理编号。

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
  {colback=white,colframe=red!50!black,fonttitle=\bfseries,
   theorem name and number}{theo}
\begin{sometheorem}{我的例子}{}
我的定理文本。
\end{sometheorem}
```

> **定理 18.22: 我的例子**
>
> 我的定理文本。

/tcb/theorem number and name (style, no value)

Prints theorem number followed by theorem name inside the title.
在标题中打印定理编号，后面跟随定理名称。

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
  {colback=white,colframe=red!50!black,fonttitle=\bfseries,
   theorem number and name}{theo}
\begin{sometheorem}{我的例子}{}
我的定理文本。
\end{sometheorem}
```

> **18.23 定理: 我的例子**
>
> 我的定理文本。

/tcb/theorem name (style, no value)

Prints theorem name without number inside the title.
在标题中打印定理名称，不包括编号。

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
  {enhanced,colback=white,colframe=red!50!black,fonttitle=\bfseries,
   theorem name,watermark text={\thetcbcounter}}{theo}
\begin{sometheorem}{我的例子}{}
我的定理文本。
\end{sometheorem}
```

> **定理: 我的例子**
>
> 我的定理文本。   18.24

/tcb/theorem number (style, no value)

Prints theorem number without name inside the title.
在标题中打印定理编号，不包括名称。

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{定理}%
  {enhanced,colback=white,colframe=red!50!black,fonttitle=\bfseries,
   theorem number}{theo}
\begin{sometheorem}{我的例子}{}
我的定理文本。
\end{sometheorem}
```

> **18.25: 我的例子**
>
> 我的定理文本。

/tcb/theorem={⟨*display name*⟩}{⟨*counter*⟩}{⟨*title*⟩}{⟨*marker*⟩} (no default)

This key can be used directly in a tcolorbox for a more flexible approach to create a theorem type box. The ⟨*display name*⟩ is used together with the increased ⟨*counter*⟩ value and the ⟨*title*⟩ for the title line of the box. Additionally, a \label with the given ⟨*marker*⟩ is created.

这个键可以直接用于 tcolorbox，以更灵活的方式创建定理类型的框。⟨*display name*⟩ 和增加的 ⟨*counter*⟩ 值以及 ⟨*title*⟩ 一起用于框的标题行。此外，还创建了一个带有给定 ⟨*marker*⟩ 的 \label。

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```
% \newcounter{texercise}% preamble
\begin{tcolorbox}[colback=green!10,colframe=green!50!black,arc=4mm,
                  theorem={Test}{texercise}{Direct usage}{myMarker}]
Here, we see the test \ref{myMarker}.

在这里，我们看到测试 \ref{myMarker}。
\end{tcolorbox}
```

> **Test 1: Direct usage**
>
> Here, we see the test 1.
> 在这里，我们看到测试 1。

For a common appearance inside the document, the key `theorem` should not be used directly as in the example above, but as part of a new environment created by hand or using **\newtcbtheorem**^{→P.1}.

为了在文档内部具有常见的外观，关键字 `theorem` 不应直接使用，如上例所示，而应作为一个新环境的一部分手动创建或使用 **\newtcbtheorem**^{→P.1}。

/tcb/highlight math (style, no value)

A style which is used for **\tcbhighmath**^{→P.3} and which is predefined as

这是用于 **\tcbhighmath**^{→P.3} 的样式，预定义为

`notitle,nophantom,colframe=red,colback=yellow!25!white`.

It can be changed with the usual `pgf` techniques or with **/tcb/highlight math style**.

可以使用常规的 `pgf` 技术或 **/tcb/highlight math style** 来更改它。

```
\begin{align*}
  \tcbhighmath{1} + 1 &= 2,\\
  \tcbset{highlight math/.append style={left=0mm,right=0mm,top=0mm,bottom=0mm}}
  \tcbhighmath{1} + 1 &= 2.
\end{align*}
```

$$\boxed{1} + 1 = 2,$$

$$\boxed{1} + 1 = 2.$$

/tcb/highlight math style=⟨*style definition*⟩ (style, no default)

Changes the definition for **/tcb/highlight math** to `notitle,nophantom` plus the given ⟨*style definition*⟩. See **\tcbhighmath**^{→P.3} for another example.

将 **/tcb/highlight math** 的定义更改为 `notitle,nophantom` 加上给定的 ⟨*样式定义*⟩。另见 **\tcbhighmath**^{→P.3} 的另一个示例。

```
% \tcbuselibrary{skins}
\tcbset{highlight math style={enhanced,%<-- needed for the `remember' options
  colframe=red,colback=red!10!white,boxsep=0pt}}
\begin{align*}
\tcbhighmath[remember as=fx]{f(x)}
    &= \int\limits_{1}^{x} \frac{1}{t^2}~dt
     = \left[ -\frac{1}{t} \right]_{1}^{x}\\
    &= -\frac{1}{x} + \frac{1}{1}\\
    &=
\tcbhighmath[remember,overlay={%
    \draw[blue,very thick,->] (fx.south) to[bend right] ([yshift=2mm]frame.west);}]
  {1-\frac{1}{x}.}
\end{align*}
```

$$\boxed{f(x)} = \int_{1}^{x} \frac{1}{t^2}\,dt = \left[-\frac{1}{t}\right]_{1}^{x}$$
$$= -\frac{1}{x} + \frac{1}{1}$$
$$= \boxed{1 - \frac{1}{x}.}$$

/tcb/math upper (style, no value)

Sets the upper part to mathematical mode with font \displaystyle.
将上部设置为数学模式，字体为\displaystyle。

/tcb/math lower (style, no value)

Sets the lower part to mathematical mode with font \displaystyle.
将下部设置为数学模式，字体为\displaystyle。

/tcb/math (style, no value)

Sets the upper part *and* lower part to mathematical mode with font \displaystyle.
将上部和下部同时设置为数学模式，字体为\displaystyle。

```
\begin{tcolorbox}[math,colback=yellow!10!white,colframe=red!50!black]
  \sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty.$$

! The following styles are only tested to work with the original `amsmath` environments. If e.g. the `equation` environment is redefined as `gather`, then **/tcb/ams equation**[→P. 16] should / could not be used. Obviously, you are encouraged to use **/tcb/ams gather**[→P. 17] in this case.

以下样式仅经过测试能够与原始的 `amsmath` 环境一起使用。如果例如 `equation` 环境被重新定义为 `gather`，那么 **/tcb/ams equation**[→P. 16] 就不能被使用，显然，在这种情况下，鼓励使用 **/tcb/ams gather**[→P. 17]。

U 2014-10-30 **/tcb/ams equation upper** (style, no value)

Adds an `amsmath` equation environment to the start and end of the upper part.
在上半部分的开头和结尾添加一个 `amsmath` equation 环境。

`/tcb/ams equation lower` (style, no value)

Adds an amsmath equation environment to the start and end of the lower part.
在下半部分的开头和结尾添加一个 amsmath equation 环境。

`/tcb/ams equation` (style, no value)

Adds an amsmath equation environment to the start and end of the upper *and* lower part.
在上半部分和下半部分的开头和结尾添加一个 amsmath equation 环境。

```
\begin{tcolorbox}[ams equation,colback=yellow!10!white,colframe=red!50!black]
  \sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \tag{13}$$

`/tcb/ams equation* upper` (style, no value)

Adds an amsmath equation* environment to the start and end of the upper part.
在上半部分的开头和结尾添加一个 amsmath equation* 环境。

`/tcb/ams equation* lower` (style, no value)

Adds an amsmath equation* environment to the start and end of the lower part.
在下半部分的开头和结尾添加一个 amsmath equation* 环境。

`/tcb/ams equation*` (style, no value)

Adds an amsmath equation* environment to the start and end of the upper *and* lower part.
在上半部分和下半部分的开头和结尾添加一个 amsmath equation* 环境。

```
\begin{tcolorbox}[ams equation*,colback=yellow!10!white,colframe=red!50!black]
  \sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty.$$

`/tcb/ams align upper` (style, no value)

Adds an amsmath align environment to the start and end of the upper part.
在上半部分的开头和结尾添加一个 amsmath align 环境。

`/tcb/ams align lower` (style, no value)

Adds an amsmath align environment to the start and end of the lower part.
在下部分的开头和结尾添加一个amsmath align 环境。

`/tcb/ams align` (style, no value)

Adds an amsmath align environment to the start and end of the upper *and* lower part.
在上部分和下部分的开头和结尾添加一个amsmath align 环境。

```
\begin{tcolorbox}[ams align,colback=yellow!10!white,colframe=red!50!black]
  \sum\limits_{n=1}^{\infty} \frac{1}{n} &= \infty.\\
  \int x^2 ~\text{d}x                    &= \frac13 x^3 + c.
\end{tcolorbox}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \tag{14}$$

$$\int x^2 \ \mathrm{d}x = \frac{1}{3}x^3 + c. \tag{15}$$

/tcb/ams align* upper (style, no value)

Adds an amsmath align* environment to the start and end of the upper part.
在上部分的开头和结尾添加一个amsmath align* 环境。

/tcb/ams align* lower (style, no value)

Adds an amsmath align* environment to the start and end of the lower part.
在下半部分的开头和结尾添加一个 amsmath align* 环境。

/tcb/ams align* (style, no value)

Adds an amsmath align* environment to the start and end of the upper *and* lower part.
在上半部分和下半部分的开头和结尾添加一个 amsmath align* 环境。

```
\begin{tcolorbox}[ams align*,colback=yellow!10!white,colframe=red!50!black]
  \sum\limits_{n=1}^{\infty} \frac{1}{n} &= \infty.\\
  \int x^2 ~\text{d}x                    &= \frac13 x^3 + c.
\end{tcolorbox}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty.$$

$$\int x^2 \ \mathrm{d}x = \frac{1}{3}x^3 + c.$$

/tcb/ams gather upper (style, no value)

Adds an amsmath gather environment to the start and end of the upper part.
在上半部分的开头和结尾添加一个 amsmath gather 环境。

/tcb/ams gather lower (style, no value)

Adds an amsmath gather environment to the start and end of the lower part.
在下部分的开头和结尾添加了一个amsmath gather 环境。

/tcb/ams gather (style, no value)

Adds an amsmath gather environment to the start and end of the upper *and* lower part.
在上部分和下部分的开头和结尾都添加了一个amsmath gather 环境。

```
\begin{tcolorbox}[ams gather,colback=yellow!10!white,colframe=red!50!black]
  \sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.\\
  \int x^2 ~\text{d}x = \frac13 x^3 + c.
\end{tcolorbox}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \tag{16}$$

$$\int x^2 \ \mathrm{d}x = \frac{1}{3}x^3 + c. \tag{17}$$

/tcb/ams gather* upper (style, no value)

Adds an `amsmath gather*` environment to the start and end of the upper part.
在上部分的开头和结尾添加了一个amsmath gather* 环境。

/tcb/ams gather* lower (style, no value)

Adds an `amsmath gather*` environment to the start and end of the lower part.
在底部的开头和结尾添加一个 amsmath gather* 环境。

/tcb/ams gather* (style, no value)

Adds an `amsmath gather*` environment to the start and end of the upper *and* lower part.
在上部和底部的开头和结尾都添加一个 amsmath gather* 环境。

```
\begin{tcolorbox}[ams gather*,colback=yellow!10!white,colframe=red!50!black]
  \sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.\\
  \int x^2 ~\text{d}x = \frac13 x^3 + c.
\end{tcolorbox}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty.$$
$$\int x^2 \ \mathrm{d}x = \frac{1}{3}x^3 + c.$$

/tcb/ams nodisplayskip upper (style, no value)

Neutralizes the `\abovedisplayskip` of a following `align` or `gather` environment for the upper part. Note that the text content has to start with such a formula.
中和后续 align 或 gather 环境上部的 \abovedisplayskip。注意，文本内容必须以这样的公式开头。

/tcb/ams nodisplayskip lower (style, no value)

Neutralizes the `\abovedisplayskip` of a following `align` or `gather` environment for the lower part. Note that the text content has to start with such a formula.
对于下部分的 align 或 gather 环境中的 \abovedisplayskip 进行中和。请注意，文本内容必须以这样的公式开头。

/tcb/ams nodisplayskip (style, no value)

Neutralizes the `\abovedisplayskip` of a following `align` or `gather` environment for the upper part *and* lower part. Note that the text content has to start with such a formula.
中和紧跟其后的 align 或 gather 环境的 \abovedisplayskip，包括上部和下部。请注意，文本内容必须以这样的公式开头。

```
\begin{tcolorbox}[ams nodisplayskip,colback=yellow!10!white,colframe=red!50!black]
  \begin{gather}
  \sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.\\
  \int x^2 ~\text{d}x = \frac13 x^3 + c.
  \end{gather}
And now for something completely different.

现在是完全不同的事情。
\end{tcolorbox}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \tag{18}$$

$$\int x^2 \ \mathrm{d}x = \frac{1}{3}x^3 + c. \tag{19}$$

And now for something completely different.
现在是完全不同的事情。

New colored mathematical environments are easily created using **\newtcolorbox**$^{\rightarrow\text{P.}??}$:

可以使用 **\newtcolorbox**$^{\rightarrow\text{P.}??}$ 轻松创建新的彩色数学环境：

```
\newtcolorbox{mymath}{ams gather*,colback=yellow!10!white,colframe=red!50!black}

\begin{mymath}
  \sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.\\
  \int x^2 ~\text{d}x = \frac13 x^3 + c.
\end{mymath}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty.$$

$$\int x^2 \ \mathrm{d}x = \frac{1}{3}x^3 + c.$$

! All described options like **/tcb/ams gather upper**$^{\rightarrow\text{P.}17}$, **/tcb/ams gather lower**$^{\rightarrow\text{P.}17}$, **/tcb/ams gather**$^{\rightarrow\text{P.}17}$ are (partially) setting (overwritting) the keys **/tcb/before upper**$^{\rightarrow\text{P.}??}$, **/tcb/after upper**$^{\rightarrow\text{P.}??}$, **/tcb/before lower**$^{\rightarrow\text{P.}??}$, **/tcb/after lower**$^{\rightarrow\text{P.}??}$.
Therefore, e.g. \tcbset{ams gather,before upper={\text{Pythagoras:}}} produces an invalid result. For this case, you are invited to use
\tcbset{ams gather,before upper app={\text{Pythagoras:}}},
see **/tcb/before upper app**$^{\rightarrow\text{P.}??}$.
所有描述的选项，如 **/tcb/ams gather upper**$^{\rightarrow\text{P.}17}$、**/tcb/ams gather lower**$^{\rightarrow\text{P.}17}$、**/tcb/ams gather**$^{\rightarrow\text{P.}17}$，都（部分地）设置（覆盖）了键 **/tcb/before upper**$^{\rightarrow\text{P.}??}$、**/tcb/after upper**$^{\rightarrow\text{P.}??}$、**/tcb/before lower**$^{\rightarrow\text{P.}??}$、**/tcb/after lower**$^{\rightarrow\text{P.}??}$。
因此，例如 \tcbset{ams gather,before upper={\text{Pythagoras:}}} 会产生无效的结果。对于这种情况，建议使用 \tcbset{ams gather,before upper app={\text{Pythagoras:}}}，参见 **/tcb/before upper app**$^{\rightarrow\text{P.}??}$。

/tcb/theorem style=⟨*name*⟩   (no default, initially `standard`)

Applies a predefined style ⟨*name*⟩ to the theorem environment. Some of the feasible ⟨*name*⟩ values resemble style names from the packages `theorem` and `ntheorem` to give convenient access to known patterns.

将预定义的样式 ⟨*name*⟩ 应用于定理环境。一些可行的 ⟨*name*⟩ 值类似于`theorem`和`ntheorem` 包中的样式名称，以便方便地访问已知的模式。

> **!** The styles alter **/tcb/separator sign**[→P.5], **/tcb/description delimiters**[→P.6], **/tcb/terminator sign**[→P.8], and more. Therefore, one should apply such keys *after* a theorem style.
> 样式会改变 **/tcb/separator sign**[→P.5]、**/tcb/description delimiters**[→P.6]、**/tcb/terminator sign**[→P.8] 等等。因此，在定理样式之后应该应用这些关键字。

For the following examples, we use:
对于以下示例，我们使用：

```
导言中的定义:
\newtcbtheorem[use counter from=mytheo]{theorem}{Theorem}{%
  fonttitle=\bfseries\upshape,fontupper=\itshape,
  colframe=green!50!black,colback=green!10!white,
  colbacktitle=green!20!white,coltitle=blue!75!black}{theo}
```

The predefined styles are:
预定义的样式有：

- **standard**: This is the initial value.

```
\begin{theorem}[theorem style=standard]{standard}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}
```

> **Theorem 18.26: standard**
>
> *This is my theorem.*
> $$a^2 + b^2 = c^2.$$

- **change standard**

```
\begin{theorem}[theorem style=change standard]{change standard}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}
```

> **18.27 Theorem: change standard**
>
> *This is my theorem.*
> $$a^2 + b^2 = c^2.$$

- **plain**

```
\begin{theorem}[theorem style=plain]{plain}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}
```

> **Theorem 18.28 (plain):** *This is my theorem.*
> $$a^2 + b^2 = c^2.$$

- **break**

  ```
  \begin{theorem}[theorem style=break]{break}{}
  This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
  \end{theorem}
  ```

  > **Theorem 18.29 (break):**
  > *This is my theorem.*
  > $$a^2 + b^2 = c^2.$$

- **plain apart**

  ```
  \begin{theorem}[theorem style=plain apart]{plain apart}{}
  This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
  \end{theorem}
  ```

  > **Theorem 18.30 (plain apart)**
  >
  > *This is my theorem.*
  > $$a^2 + b^2 = c^2.$$

- **change**

  ```
  \begin{theorem}[theorem style=change]{change}{}
  This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
  \end{theorem}
  ```

  > **18.31 Theorem (change):** *This is my theorem.*
  > $$a^2 + b^2 = c^2.$$

- **change break**

  ```
  \begin{theorem}[theorem style=change break]{change break}{}
  This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
  \end{theorem}
  ```

  > **18.32 Theorem (change break):**
  > *This is my theorem.*
  > $$a^2 + b^2 = c^2.$$

- **change apart**

  ```
  \begin{theorem}[theorem style=change apart]{change apart}{}
  This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
  \end{theorem}
  ```

  > **18.33 Theorem (change apart)**
  >
  > *This is my theorem.*
  > $$a^2 + b^2 = c^2.$$

- **`margin`**

  ```
  \begin{theorem}[theorem style=margin,left=10mm]{margin}{}
  This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
  \end{theorem}
  \begin{theorem}[theorem style=margin,left=10mm,oversize]{margin}{}
  This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
  \end{theorem}
  ```

  > **18.34 Theorem (margin):** *This is my theorem.*
  > $$a^2 + b^2 = c^2.$$

  18.35 Theorem (margin): *This is my theorem.*
  $$a^2 + b^2 = c^2.$$

- **`margin break`**

  ```
  \begin{theorem}[theorem style=margin break,left=10mm]{margin break}{}
  This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
  \end{theorem}
  \begin{theorem}[theorem style=margin break,left=10mm,oversize]{margin break}{}
  This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
  \end{theorem}
  ```

  > **18.36 Theorem (margin break):**
  > *This is my theorem.*
  > $$a^2 + b^2 = c^2.$$

  18.37 Theorem (margin break):
  This is my theorem.
  $$a^2 + b^2 = c^2.$$

- **`margin apart`**

  ```
  \begin{theorem}[theorem style=margin apart,left=10mm]{margin apart}{}
  This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
  \end{theorem}
  \begin{theorem}[theorem style=margin apart,left=10mm,oversize]{margin apart}{}
  This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
  \end{theorem}
  ```

  > **18.38 Theorem (margin apart)**
  >
  > *This is my theorem.*
  > $$a^2 + b^2 = c^2.$$

  18.39 Theorem (margin apart)

  This is my theorem.
  $$a^2 + b^2 = c^2.$$

18.3 Examples for Definitions and Theorems
定义和定理的示例

In the following, the application of \newtcbtheorem[→P.1] to highlight mathematical definitions, theorems, or the like is demonstrated.

以下展示了使用 \newtcbtheorem[→P.1]突出数学定义、定理或类似内容的应用。

At first, additional `tcb` keys are created for the appearance of the colored boxes. It is assumed that theorems and corollaries should be identically colored.

首先，为了出现有色框，需要创建额外的`tcb` 键。假设定理和推论应该是同样的颜色。

All following environments are numbered with a common counter, but this can be changed easily. Here, the counter output is supplemented by the subsection number. Further, the `cleveref` package is used for clever references.

所有下列环境都使用一个公共计数器进行编号，但这可以很容易地更改。在这里，计数器输出还会加上子节编号。另外，使用 cleveref 宏包进行智能引用。

```
导言中的定义:
% \usepackage{cleveref}
\tcbset{
  defstyle/.style={fonttitle=\bfseries\upshape, fontupper=\slshape,
                   arc=0mm, colback=blue!5!white,colframe=blue!75!black},
  theostyle/.style={fonttitle=\bfseries\upshape, fontupper=\slshape,
                    colback=red!10!white,colframe=red!75!black},
}
\newtcbtheorem[number within=subsection,crefname={definition}{definitions}]%
  {Definition}{Definition}{defstyle}{def}
\newtcbtheorem[use counter from=Definition,crefname={theorem}{theorems}]%
  {Theorem}{Theorem}{theostyle}{theo}
\newtcbtheorem[use counter from=Definition,crefname={corollary}{corollaries}]%
  {Corollary}{Corollary}{theostyle}{cor}
```

By \newtcbtheorem[→P.1], commonly numbered theorem environments are created now. `defstyle` and `theostyle` are used for the appearance.

通过 \newtcbtheorem[→P.1]，现在可以创建常见编号的定理环境。`defstyle` 和 `theostyle` 用于外观样式。

Now, everything is prepared for the following examples.

现在，一切都准备就绪，可以进行以下示例。

```
The following theorem is numbered as \Cref{theo:diffbarstetig} and
referenced with the marker \texttt{theo:diffbarstetig}.

以下定理标号为\Cref{theo:diffbarstetig}，使用标记\texttt{theo:diffbarstetig}进行引用。
\begin{Theorem}{Differenzierbarkeit bedingt Stetigkeit, wobei diese Benennung
  zu Testzwecken ungew\"{o}hnlich lang ist}{diffbarstetig}%
  Eine Funktion $f:I\to\mathbb{R}$ ist in $x_0\in I$ stetig, wenn $f$ in
  $x_0$ differenzierbar ist.
\end{Theorem}
```

The following theorem is numbered as Theorem 18.3.1 and referenced with the marker `theo:diffbarstetig`.

以下定理标号为 Theorem 18.3.1，使用标记 `theo:diffbarstetig` 进行引用。

> **Theorem 18.3.1: Differenzierbarkeit bedingt Stetigkeit, wobei diese Benennung zu Testzwecken ungewöhnlich lang ist**
>
> *Eine Funktion $f : I \to \mathbb{R}$ ist in $x_0 \in I$ stetig, wenn f in x_0 differenzierbar ist.*

```
The following definition is numbered as \Cref{def:diffbarkeit} and
referenced with the marker \texttt{def:diffbarkeit}.\bigskip

下面的定义编号为\Cref{def:diffbarkeit}，并使用标记\texttt{def:diffbarkeit}引用。
\begin{Definition}{Differenzierbarkeit}{diffbarkeit}
  Eine Funktion $f:~I\to\mathbb{R}$ auf einem Intervall $I$ hei\ss{}t in
  $x_0\in I$ differenzierbar oder linear approximierbar,
  wenn der Grenzwert
  \begin{equation*}
  \lim\limits_{x\to x_0}\frac{f(x)-f(x_0)}{x-x_0}=
  \lim\limits_{h\to 0}\frac{f(x_0+h)-f(x_0)}{h}
  \end{equation*}
  existiert. Bei Existenz hei\ss{}t dieser Grenzwert Ableitung
  oder Differentialquotient von $f$ in $x_0$ und man
  schreibt f\"{u}r ihn
  \begin{equation*}
  f'(x_0)\quad\text{oder}\quad\frac{df}{dx}(x_0).
  \end{equation*}
\end{Definition}
```

The following definition is numbered as Definition 18.3.2 and referenced with the marker `def:diffbarkeit`.

下面的定义编号为 Definition 18.3.2，并使用标记 `def:diffbarkeit` 引用。

> **Definition 18.3.2: Differenzierbarkeit**
>
> *Eine Funktion $f : I \to \mathbb{R}$ auf einem Intervall I heißt in $x_0 \in I$ differenzierbar oder linear approximierbar, wenn der Grenzwert*
>
> $$\lim_{x\to x_0} \frac{f(x)-f(x_0)}{x-x_0} = \lim_{h\to 0} \frac{f(x_0+h)-f(x_0)}{h}$$
>
> *existiert. Bei Existenz heißt dieser Grenzwert Ableitung oder Differentialquotient von f in x_0 und man schreibt für ihn*
>
> $$f'(x_0) \quad oder \quad \frac{df}{dx}(x_0).$$

```
The following corollary is numbered as \Cref{cor:nullstellen} and
referenced with the marker \texttt{cor:nullstellen}.

以下推论标号为\Cref{cor:nullstellen}，并且使用标记\texttt{cor:nullstellen}进行引用。\bigskip
\begin{Corollary}{Nullstellenexistenz}{nullstellen}
  Ist $f:[a,b]\to\mathbb{R}$ stetig und haben $f(a)$ und $f(b)$ entgegengesetzte
  Vorzeichen, also $f(a)f(b)<0$, so besitzt $f$ eine Nullstelle $x_0\in]a,b[$,
  also $f(x_0)=0$.
\end{Corollary}
```

The following corollary is numbered as Corollary 18.3.3 and referenced with the marker `cor:nullstellen`.
以下推论标号为 Corollary 18.3.3，并且使用标记 `cor:nullstellen` 进行引用。

> **Corollary 18.3.3: Nullstellenexistenz**
>
> *Ist $f : [a, b] \to \mathbb{R}$ stetig und haben $f(a)$ und $f(b)$ entgegengesetzte Vorzeichen, also $f(a)f(b) < 0$, so besitzt f eine Nullstelle $x_0 \in]a, b[$, also $f(x_0) = 0$.*

```
\begin{Theorem}[boxrule=2mm,toptitle=-1.5mm,bottomtitle=-1.5mm]{%
    Hinreichende Bedingung f\"{u}r Wendepunkte}{wendehinreichend}%
  $f$ sei eine auf einem Intervall $]a,b[$ dreimal stetig differenzierbare Funktion.
  Ist $f''(x_0)=0$ in $x_0\in]a,b[$ und $f'''(x_0)\ne 0$, so ist
  $(x_0,f(x_0))$ ein Wendepunkt von $f$.
\end{Theorem}
```

> **Theorem 18.3.4: Hinreichende Bedingung für Wendepunkte**
>
> *f sei eine auf einem Intervall $]a, b[$ dreimal stetig differenzierbare Funktion. Ist $f''(x_0) = 0$ in $x_0 \in]a, b[$ und $f'''(x_0) \neq 0$, so ist $(x_0, f(x_0))$ ein Wendepunkt von f.*

```
% \usepackage{varioref}
% \usepackage{cleveref}
% \tcbuselibrary{skins}
\newtcbtheorem[use counter from=Definition]{YetAnotherTheorem}{Theorem}%
  {theorem style=plain apart,label type=theorem,enhanced,frame hidden,
  boxrule=2mm,titlerule=0mm,toptitle=1mm,bottomtitle=1mm,
  fonttitle=\bfseries\large,fontupper=\normalsize,
  coltitle=green!35!black,colbacktitle=green!15!white,
  colback=green!50!yellow!15!white,borderline={1pt}{0pt}{green!25!blue},
  }{theo}

\begin{YetAnotherTheorem}{Mittelwertsatz f\"{u}r $n$ Variable}{meanvaluetheorem}%
  Es sei $n\in\mathbb{N}$, $D\subseteq\mathbb{R}^n$ eine offene Menge und
  $f\in C^{1}(D,\mathbb{R})$. Dann gibt es auf jeder Strecke
  $[x_0,x]\subset D$ einen Punkt $\xi\in[x_0,x]$, so dass gilt
  \begin{equation*}
  f(x)-f(x_0) = \operatorname{grad} f(\xi)^{\top}(x-x_0)
  \end{equation*}
\end{YetAnotherTheorem}

\medskip
Here, |cleveref| support is used to reference \Cref{theo:meanvaluetheorem}
on \Cpageref{theo:meanvaluetheorem}. This \namecref{theo:meanvaluetheorem}
can also be referenced by |\Vref| resulting in \Vref{theo:meanvaluetheorem}.

这里使用了 |cleveref| 支持来引用\Cref{theo:meanvaluetheorem}，它位于 ↪
    ↪\Cpageref{theo:meanvaluetheorem}。这个\namecref{theo:meanvaluetheorem}也可以通过 ↪
    ↪|\Vref| 引用，结果为 \Vref{theo:meanvaluetheorem}。
```

> **Theorem 18.3.5 (Mittelwertsatz für n Variable)**
>
> Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0,x] \subset D$ einen Punkt $\xi \in [x_0,x]$, so dass gilt
>
> $$f(x) - f(x_0) = \operatorname{grad} f(\xi)^{\top}(x - x_0)$$

Here, `cleveref` support is used to reference Theorem 18.3.5 on Page 26. This theorem can also be referenced by `\Vref` resulting in Theorem 18.3.5.
这里使用了 `cleveref` 支持来引用 Theorem 18.3.5，它位于 Page 26。这个 theorem 也可以通过 \Vref 引用，结果为 Theorem 18.3.5。

! Note that /tcb/label type$^{\rightarrow \text{P.}??}$ was used in the example above to feed `cleveref` with the needed name information.
请注意，上面的示例中使用了 /tcb/label type$^{\rightarrow \text{P.}??}$ 来提供所需的名称信息，以便将其提供给 `cleveref`。

```
Here, using |\Vref| resulting in \Vref{theo:meanvaluetheorem} is more interesting\ldots
```

在这里，使用 |\Vref| 得到的 \Vref{theo:meanvaluetheorem} 更有趣...

Here, using `\Vref` resulting in Theorem 18.3.5 is more interesting...
在这里，使用 \Vref 得到的 Theorem 18.3.5 更有趣...

```
% \tcbuselibrary{skins}
\newtcbtheorem[use counter from=Definition]{YetAnotherTheorem}{Theorem}%
  {theorem style=change apart,enhanced,arc=0mm,outer arc=0mm,
  boxrule=0mm,toprule=1mm,bottomrule=1mm,left=1mm,right=1mm,
  titlerule=0mm,toptitle=0mm,bottomtitle=1mm,top=0mm,
  colframe=red!50!black,colback=red!5!white,coltitle=red!50!black,
  title style={top color=yellow!50!white,bottom color=red!5!white,
    middle color=yellow!50!white},
  fonttitle=\bfseries\sffamily\normalsize,fontupper=\normalsize\itshape,
  }{theo}

\begin{YetAnotherTheorem}{Mittelwertsatz f\"{u}r $n$ Variable}{mittelwertsatz_n2}%
  Es sei $n\in\mathbb{N}$, $D\subseteq\mathbb{R}^n$ eine offene Menge und
  $f\in C^{1}(D,\mathbb{R})$. Dann gibt es auf jeder Strecke
  $[x_0,x]\subset D$ einen Punkt $\xi\in[x_0,x]$, so dass gilt
  \begin{equation*}
  f(x)-f(x_0) = \operatorname{grad} f(\xi)^{\top}(x-x_0)
  \end{equation*}
\end{YetAnotherTheorem}
```

18.3.6 Theorem (Mittelwertsatz für n Variable)

Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D, \mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0, x] \subset D$ einen Punkt $\xi \in [x_0, x]$, so dass gilt

$$f(x) - f(x_0) = \operatorname{grad} f(\xi)^{\top}(x - x_0)$$

```
% \usepackage{varwidth}   \tcbuselibrary{skins}
\newtcbtheorem[use counter from=Definition]{YetAnotherTheorem}{Theorem}%
{enhanced,frame empty,interior empty,colframe=ForestGreen!50!white,
  coltitle=ForestGreen!50!black,fonttitle=\bfseries,colbacktitle=ForestGreen!15!white,
  borderline={0.5mm}{0mm}{ForestGreen!15!white},
  borderline={0.5mm}{0mm}{ForestGreen!50!white,dashed},
  attach boxed title to top center={yshift=-2mm},
  boxed title style={boxrule=0.4pt},varwidth boxed title}{theo}

\begin{YetAnotherTheorem}{Mittelwertsatz f\"{u}r $n$ Variable}{mittelwertsatz_n3}%
  Es sei $n\in\mathbb{N}$, $D\subseteq\mathbb{R}^n$ eine offene Menge und
  $f\in C^{1}(D,\mathbb{R})$. Dann gibt es auf jeder Strecke
  $[x_0,x]\subset D$ einen Punkt $\xi\in[x_0,x]$, so dass gilt
  \begin{equation*}
  f(x)-f(x_0) = \operatorname{grad} f(\xi)^{\top}(x-x_0)
  \end{equation*}
\end{YetAnotherTheorem}
```

Theorem 18.3.7: Mittelwertsatz für n Variable

Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D, \mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0, x] \subset D$ einen Punkt $\xi \in [x_0, x]$, so dass gilt

$$f(x) - f(x_0) = \operatorname{grad} f(\xi)^{\top}(x - x_0)$$

You need more attention for your theorems? Here, you are . . .

你需要更多关注你的定理吗？在这里，就是这里。...

```
% tcbuselibrary{skins}  % preamble
\begin{Theorem}[enhanced,
    fuzzy halo=3mm with yellow,
    fuzzy halo=2mm with red,
    fuzzy halo=1mm with yellow,
    watermark color=red!35!white,
    watermark text={Overacting\\Fundamental Theorem}]%
  {Fundamental Theorem of Theorems}{fundamental}%
  \lipsum[1-2]
\end{Theorem}
```

Theorem 18.3.8: Fundamental Theorem of Theorems

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer 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.
Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Let's try a more conservative approach:

让我们尝试一种更为保守的方法：

```
% \tcbuselibrary{skins}
\newtcbtheorem[use counter from=Definition]{YetAnotherTheorem}{Theorem}%
  {theorem style=plain,enhanced,colframe=blue!50!black,colback=yellow!20!white,
   coltitle=red!50!black,fonttitle=\upshape\bfseries,fontupper=\itshape,
   drop fuzzy shadow=blue!50!black!50!white,boxrule=0.4pt}{theo}

\begin{YetAnotherTheorem}{Mittelwertsatz f\"{u}r $n$ Variable}{mittelwertsatz_n4}%
  Es sei $n\in\mathbb{N}$, $D\subseteq\mathbb{R}^n$ eine offene Menge und
  $f\in C^{1}(D,\mathbb{R})$. Dann gibt es auf jeder Strecke
  $[x_0,x]\subset D$ einen Punkt $\xi\in[x_0,x]$, so dass gilt
  \begin{equation*}
  f(x)-f(x_0) = \operatorname{grad} f(\xi)^{\top}(x-x_0)
  \end{equation*}
\end{YetAnotherTheorem}
```

Theorem 18.3.9 (Mittelwertsatz für n Variable): *Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0,x] \subset D$ einen Punkt $\xi \in [x_0,x]$, so dass gilt*

$$f(x) - f(x_0) = \operatorname{grad} f(\xi)^{\top}(x - x_0)$$

18.4 Using other theorem environments with `tcolorbox`
使用 tcolorbox 与其他定理环境

Instead of creating theorem environments with the methods described before, environments from other packages can be boxed with a `tcolorbox`.

除了使用之前描述的方法创建定理环境之外，也可以使用 `tcolorbox` 将来自其他包的环境框起来。

Environments may be created e.g. by methods from the `theorem` package or the `amsthm` package. **\tcolorboxenvironment**^{→P.??} can be used to put a box around these environments.

可以使用 `theorem` 包或 `amsthm` 包中的方法创建环境。可以使用 **\tcolorboxenvironment**^{→P.??} 将框框放在这些环境周围。

```
导言中的定义:
\usepackage{amsthm}

\theoremstyle{plain}%     from `amsthm'
\newtheorem{lem}{Lemma}% from `amsthm'

\tcolorboxenvironment{lem}{
  enhanced jigsaw,colframe=cyan,interior hidden,
  breakable,before skip=10pt,after skip=10pt }

\tcolorboxenvironment{proof}{% `proof' from `amsthm'
  blanker,breakable,left=5mm,
  before skip=10pt,after skip=10pt,
  borderline west={1mm}{0pt}{red}}
```

```
\begin{lem}
  \lipsum[2]
\end{lem}

\lipsum[3]

\begin{proof}
  \lipsum*[4]
\end{proof}
```

> **Lemma 1.** *Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.*

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

Proof. Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula. □