

The greenbook package

A book style for memoir

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Using the package

The parts of the book

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About this manual

greenbook is a book style for the `memoir` class. It hangs section numbers in the left margin and opens chapters under a band of colour with a large number. Theorems stand in framed boxes with their names in the right margin, and footnotes, notes and captions are set in that margin too. The table of contents is a ruled grid (the design of `artbook.sty`, in the colours of greenbook), and `\maketitle` makes a coloured cover.

This manual is set in greenbook, so its pages show what the package does. The first part explains how to load the package and choose its fonts and boxes, the second the parts of the book (contents, chapter heads, cover, notes, figures), and the third lists the packages greenbook loads, its commands and colours, and the macros of the option `macros`. The fonts are the first ones of each list in chapter 2 that are installed on the machine that compiled it.

Part 1



Using the package

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1 Loading

1.1 The preamble

greenbook is a package, not a class. Load `memoir` first:

```
\documentclass[a4paper,10pt,openany]{memoir}
\usepackage[exercises,macros]{greenbook}
```

If the class is not `memoir`, greenbook stops with an error and loads nothing. It needs LuaLaTeX (or XeLaTeX), since it sets its fonts with `fontspec`; under pdfLaTeX it stops with an error.

The package sets its own page size and margins (section 6.1). The paper options of the class only matter with `layout=false`.

1.2 Options

Options are `key=value` pairs. The first group can only be given when the package is loaded:

`fonts = original | garamond | libertinus | pagella | lm`
: The font preset (chapter 2). Default `original`.

`math = auto | mtpro2 | newtx | unicode | cm`
: The math fonts (section 2.2). Default `auto`.

`mainfont, sansfont, monofont, chapterfont, chapnumfont, mathfont`
: A font name tried before the fonts of the preset.

`layout = true | false`
: `false` keeps the page layout of the class. Default `true`.

`cover = true | false`
: `\maketitle` makes the coloured cover of section 5.2; `false` keeps memoir's title page. Default `true`.

`toc = grid | classic`
: The grid table of contents, or the two-column one of greenbook 1.x. Default `grid`.

`footnotes = margin | normal`
Footnotes as numbered notes in the margin, or at the foot of the page. Default `margin`.

`exercises`
Loads `xsim` and sets up exercises and solutions (section 6.6).

`macros`
Loads `greenbook-macros` (chapter 9).

`ell`
Every `l` in math prints as ℓ, except inside `\mathrm` and the other alphabets.

The second group can also be changed in the document, with `\greenbooksetup{...}`:

`breakable = true | false`
May theorem boxes break across pages. Default `true`.

`split = closed | open | marked`
How a broken box looks (section 3.4). Default `marked`.

`needspace = ⟨number⟩`
A breakable box starts on a new page unless this many lines fit. Default `4`.

`labelsep = ⟨length⟩`
Distance from the right side of a box to its label in the margin. Default `7pt`.

`captions = margin | below`
Captions of figures and tables in the margin, or memoir's captions under the float (section 6.5). Default `margin`.

`accent = ⟨colour⟩`
The colour of the bands, rules, tabs and numbers. Default `slategreen`.

`parttoc = true | false`
The chapters of a part listed on its part page (section 4.3). Default `false`; this manual sets it to `true`.

`indentafterbox = true | false`
Is the paragraph after a box indented (section 3.3). Default `false`.

`toclabel, tocsectionlabel, tocchapterlabel, tocfooter, tocwidth, partextend, partskip, …`
The grid table of contents (section 4.2).

`headingfont, labelfont, displayfont, numberfont`
The four families the parts of the page are set in (section 2.3).

`⟨part⟩font, ⟨part⟩size`
The family and the size of one part of the page, for example `thmlabelfont` or `toclabelsize` (section 2.3).

2 Fonts

2.1 Text fonts

Each font is the first installed font of a list: the font given by its key (for example `mainfont=Minion Pro`), then the fonts of the preset, then a font that comes with every TEX Live. So a document compiles on a machine without Sabon or Jost, in fonts close to them. The log names the font that was taken for each role (search it for `greenbook Info`).

preset	main	sans	mono
`original`	Sabon, EB Garamond	Jost	JetBrains Mono
`garamond`	EB Garamond	Jost	JetBrains Mono
`libertinus`	Libertinus Serif	Libertinus Sans	Libertinus Mono
`pagella`	TeX Gyre Pagella	TeX Gyre Heros	DejaVu Sans Mono
`lm`	Latin Modern	Latin Modern Sans	Latin Modern Mono

The math fonts of each preset are listed in section 2.2. The last resorts are TeX Gyre Pagella and Latin Modern Roman (main), TeX Gyre Heros and Latin Modern Sans (sans), DejaVu Sans Mono and Latin Modern Mono (mono), and Latin Modern Math. Chapter titles use EB Garamond, else the main font; the big chapter numbers use Riesling, else the chapter font in italic.

2.2 Math fonts

With `math=auto` the first installed setup of the preset's list is used: `original` tries mtpro2, Garamond-Math, newtx and Latin Modern Math; `garamond` Garamond-Math, newtx and Latin Modern Math; `libertinus` Libertinus Math; `pagella` TeX Gyre Pagella Math; `lm` Latin Modern Math. The setups are:

`mtpro2`
: MathTime Pro 2 lite with `mathalpha` (BOONDOX calligraphic, double-struck serif, ESSTIX fraktur, dutchcal script). This is the look of greenbook 1.x. It is not part of TEX Live.

`newtx`
: `newtxmath`.

`unicode`
: `unicode-math` with an OpenType math font; give one with `mathfont=`⟨*name*⟩.

`cm`
: Computer Modern (Latin Modern) math.

`math=mtpro2` and the others force a setup; if it is not installed the package warns and uses Latin Modern Math. With the legacy setups (mtpro2, newtx, cm) operator names such as sin and lim are set in the text font.

With `unicode`, a command that expands to more than one token needs braces in a subscript: write `x_{\C}`, not `x_\C`, if `\C` is `\mathbb{C}`. The legacy fonts accept both.

2.3 Fonts of the parts of the page

The fonts chosen above (`mainfont`, `sansfont`, …) are the families of the document. The parts of the page that are not body text are set in four families on top of them:

`headingfont`
: the family the parts below fall back to when their own fonts are not installed [`\sffamily`, that is `sansfont`]

`labelfont`
: the small labels of the contents and of the part pages [DINdong, letter-spaced; else `\ttfamily`, letter-spaced]

`displayfont`
: chapter titles and the title on the cover [`\chapterfont`]

`numberfont`
: the big chapter numbers [`\chapternumfont`]

Changing one family changes every part set in it, and the sizes stay as they were, so

```
\greenbooksetup{headingfont = {\gbfont{PP Mori}}}
```

sets all the headings in PP Mori, at the sizes they had. `\gbfont{family}[features]` switches to any installed font at the size the size keys give; `[Scale=0.95]` or `[Scale=MatchLowercase]` adjusts a font whose letters are larger or smaller than usual. A family without a Bold face uses its Semibold or Medium face for `\bfseries`. A font that is not installed is reported in the log, and the current font is kept. `\gbfontelse{family}[features]{fallback}` is `\gbfont` when the font is installed and ⟨*fallback*⟩ otherwise, without a warning; the defaults of the font keys are written with it, so a document looks as intended on a machine with Jost, DINdong and PP Mori, and falls back to the families of the preset elsewhere. Section numbers follow the font of the section titles unless `secnumberfont` is set.

For finer control each part has two keys: ⟨*part*⟩`font` sets its family, series and shape, and ⟨*part*⟩`size` its size. For example

```
\greenbooksetup{
  thmlabelfont = {\gbfont{QTBasker}\bfseries},
```

```
  toclabelsize = {\fontsize{7pt}{8pt}\selectfont},
}
```

The parts, with their defaults (family; size). "Jost Medium, else heading bold" means `\gbfontelse{Jost Medium}{...}`:

`chaptertitle`
: the title of a chapter (display; 36 pt)

`chapternumber`
: the big number of a chapter (number; 144 pt)

`section, subsection, secnumber`
: section titles and numbers (Jost Light, else heading; `\Large`, `\large`; the numbers in DINdong, else as the title)

`partname, parttitle`
: "Part 1" and the title on a part page (roman; `\LARGE`, italic `\Huge`)

`header, headerpage`
: the running head and its page number (the page number is in the head only with `marginbar=false`)

`thmlabel, thmnote`
: the name of a box in the margin, and its title (Jost Medium, else heading bold)

`tab, examplenote`
: the tab of an example (Jost Medium, else heading bold), and its title (roman bold)

`remarkhead`
: the head of a remark (Jost Medium, else heading bold)

`captionlabel, caption`
: "Figure 1.3" and the caption text (Jost Medium, else heading, and roman; `\footnotesize`)

`note`
: footnotes and margin notes (roman; `\small`)

`marginbar`
: the page number and chapter title on the margin bar (label; 7 pt)

`toclabel, tocnumber`
: the labels of the contents: chapters, the label above the grid and the footer (label; 7 pt), and the section numbers (the family of `toclabel`; 6 pt)

`tocpart, toctitle, tocpage`
: part titles, section titles and page numbers of the contents (PP Mori Semibold, else heading bold; roman; roman; 20, 9, 9 pt)

`cover`
: the title on the cover (display; 48 pt)

All these keys can be set in the preamble or anywhere in the document.

3 Theorems and boxes

3.1 The environments

All are declared with `thmtools`:

environment	style	numbered
`theorem`, `lemma`	`hangingtheo`	per chapter
`definition`	`hangingdef` (tinted)	per chapter
`theorem*`, `lemma*`	`hangingtheo`	no
`question`	`hangingques`	no
`example`	`thmexample`	per chapter
`nonexample`	`thmnonexample`	with `example`
`remark`	`thmremark`	per section
`proposition`, `corollary`	`plain` (no box)	with `theorem`
`proposition*`, `corollary*`, `claim`	`plain` (no box)	no

Two more boxes are not theorem environments: `caution` and `\prototype` (section 3.2). New environments in the same styles are declared as usual, for example

```
\declaretheorem[style=hangingtheo, name=Notation,
  sibling=theorem]{notation}
```

3.2 Each environment

Every environment of the table, each after its source. The optional argument is the title of the box.

Framed boxes

A `definition` has a pale tint and a thinner frame, so that it reads apart from a theorem or a lemma at a glance.

```
\begin{definition}[Convergence]
A sequence $(a_n)$ converges to $L$ if for every $\varepsilon >
```

```
  0$ there
is an $N$ with $\abs{a_n - L} < \varepsilon$ for all $n \geq N$.
\end{definition}
```

Convergence
A sequence (a_n) converges to L if for every $\varepsilon > 0$ there is an N with $|a_n - L| < \varepsilon$ for all $n \geq N$.

Definition 3.1

```
\begin{theorem}[Monotone convergence]\label{thm:monotone}
A bounded increasing sequence converges to its supremum.
\end{theorem}
```

Monotone convergence
A bounded increasing sequence converges to its supremum.

Theorem 3.1

`\cref{thm:monotone}` gives theorem 3.1.

```
\begin{lemma}
If $a_n \to L$, every subsequence of $(a_n)$ converges to $L$.
\end{lemma}
```

If $a_n \to L$, every subsequence of (a_n) converges to L.

Lemma 3.2

The starred forms are the same boxes without a number:

```
\begin{theorem*}[Bolzano--Weierstrass]
Every bounded sequence has a convergent subsequence.
\end{theorem*}
\begin{lemma*}
A convergent sequence is bounded.
\end{lemma*}
```

Bolzano–Weierstrass
Every bounded sequence has a convergent subsequence.

Theorem

A convergent sequence is bounded.

Lemma

```
\begin{question}
Does every Cauchy sequence of rationals converge to a rational?
\end{question}
```

Does every Cauchy sequence of rationals converge to a rational? **Question**

Examples and remarks

```
\begin{example}[A geometric sequence]
The sequence $a_n = r^n$ converges to $0$ when $\abs{r} < 1$.

The second paragraph of an example is set off by a little space.
\end{example}
\begin{example}
An example without a title.
\end{example}
```

Example 3.1 **A geometric sequence**

The sequence $a_n = r^n$ converges to 0 when $|r| < 1$.

The second paragraph of an example is set off by a little space.

Example 3.2

An example without a title.

A `nonexample` is an example box with a plum tab and frame. It counts with the examples, and `\cref` calls it a non-example.

```
\begin{nonexample}[Not a limit]
The sequence $a_n = (-1)^n$ does not converge: no $L$ satisfies the
definition.
\end{nonexample}
```

Non-example 3.3 **Not a limit**

The sequence $a_n = (-1)^n$ does not converge: no L satisfies the definition.

```
\begin{remark}
A remark is set in small type between two rules.
\end{remark}
```

Remark 3.2.1. A remark is set in small type between two rules.

Cautions and prototypes

`caution` sets a trap apart: a tinted box with a rule on the left in the colour `gbcaution` and the word *Caution* in the margin. Its optional argument is a short title, printed before the body. The box may break across pages.

```
\begin{caution}[Order of quantifiers]
$\forall \varepsilon\, \exists N$ is not $\exists N\, \forall \varepsilon$: the
second says that one $N$ serves every $\varepsilon$.
\end{caution}
```

Order of quantifiers
$\forall \varepsilon\, \exists N$ is not $\exists N\, \forall \varepsilon$: the second says that one N serves every ε.

Caution

`\prototype{text}` is a tinted strip with *Prototype* in the margin, for the example that a section keeps coming back to. It does not break.

```
\prototype{The sequence $a_n = 1/n$ is the prototypical convergent sequence:
it tends to $0$ without ever reaching it.}
```

The sequence $a_n = 1/n$ is the prototypical convergent sequence: it tends to 0 without ever reaching it.

Prototype

Unboxed statements

```
\begin{proposition}
The limit of a convergent sequence is unique.
\end{proposition}
\begin{corollary}
A sequence with two different subsequential limits diverges.
\end{corollary}
\begin{proposition*}
An unnumbered proposition.
\end{proposition*}
\begin{corollary*}
An unnumbered corollary.
\end{corollary*}
\begin{claim}
$\sqrt{2}$ is irrational.
\end{claim}
```

Proposition 3.3. *The limit of a convergent sequence is unique.*

Corollary 3.4. *A sequence with two different subsequential limits diverges.*

Proposition. *An unnumbered proposition.*

Corollary. *An unnumbered corollary.*

Claim. $\sqrt{2}$ *is irrational.*

Proofs and solutions

`proof` is the environment of `amsthm`; `soln` and `subproof` come with the option `macros`.

```
\begin{proof}
Suppose $\sqrt{2} = p/q$ in lowest terms.  Then $p^2 = 2q^2$, so
  $p$ is
even, and then so is $q$.
\begin{subproof}[Why $q$ is even]
Write $p = 2k$; then $q^2 = 2k^2$.
\end{subproof}
Both are even, against lowest terms.
\end{proof}
\begin{soln}
A solution is a proof headed \emph{Solution} and closed by a
  rule.
\end{soln}
```

Proof. Suppose $\sqrt{2} = p/q$ in lowest terms. Then $p^2 = 2q^2$, so p is even, and then so is q.

Why q is even. Write $p = 2k$; then $q^2 = 2k^2$. ■

Both are even, against lowest terms. □

Solution. A solution is a proof headed *Solution* and closed by a rule. □

The boxes are `tcolorboxes`. They are opened by the key `gbbox` of `\declaretheoremstyle`, which takes one of `theorem`, `question`, `definition`, `example`, `nonexample`, `remark`; the box styles are the `tcolorbox` styles `gb/theorem`, `gb/question`, `gb/definition`, `gb/example`, `gb/nonexample` and `gb/remark`, which can be changed with `\tcbset`, for example

```
\tcbset{gb/theorem/.append style={colback=lightslategreen}}
```

`gb/definition` starts from `gb/theorem`, and `gb/nonexample` from `gb/example`, and each then sets its own colours, so a change of their colours goes into `gb/definition` or `gb/nonexample` itself.

3.3 The paragraph after a box

The paragraph that follows a box (a theorem, an example, a remark, the overview, a solution or a group of exercises) starts flush left, as the paragraph after a heading does, whether or not a blank line follows the box. Text that continues the sentence before the box therefore needs no `\noindent`. `\greenbooksetup{indentafterbox=true}` indents it as any other paragraph.

3.4 Breaking across pages

In greenbook 1.x the framed boxes never broke: a box that did not fit on the page went to the next one and left the rest of the page empty. Now every box may break, and starts on a new page only when fewer than `needspace` lines fit. `\greenbooksetup{breakable=false}` restores the old behaviour from that point on. For a single box:

`\gbkeep`
: the next box does not break;

`\gbbreak`
: the next box may break, even with `breakable=false`.

The key `split` sets how the parts of a broken box look:

`closed`
: every part is a complete box, with four sides and rounded corners;

`open`
: the box is open where it breaks, with square corners there;

`marked`
: as `open`, with a dashed line at each cut and the name of the box repeated in the margin of the later parts, marked *continued*.

The file `greenbook-breaking-demo.pdf` shows `breakable=false` and the three settings of `split` on the same text. The long definition below shows `split=marked` wherever it meets the foot of a page.

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.

A long definition Definition 3.2

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

Definition 3.2
continued

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.

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.

Fusce mauris. Vestibulum luctus nibh at lectus. Sed bibendum, nulla a faucibus semper, leo velit ultricies tellus, ac venenatis arcu wisi vel nisl. Vestibulum diam. Aliquam pellentesque, augue quis sagittis posuere, turpis lacus congue quam, in hendrerit risus eros eget felis. Maecenas eget erat in sapien mattis porttitor. Vestibulum porttitor. Nulla facilisi. Sed a turpis eu lacus commodo facilisis. Morbi fringilla, wisi in dignissim interdum, justo lectus sagittis dui, et vehicula libero dui cursus dui. Mauris tempor ligula sed lacus. Duis cursus enim ut augue. Cras ac magna. Cras nulla. Nulla egestas. Curabitur a leo. Quisque egestas wisi eget nunc. Nam feugiat lacus vel est. Curabitur consectetuer.

Two limits. A box inside another box (a minipage, a table cell) cannot break. `\marginpar` does not work inside any box, broken or not; footnotes do, since inside boxes they are set with `\marginnote`.

3.5 The overview box

`\begin{overview} ... \end{overview}` is the tinted summary box after a chapter head. It is 180 mm wide, so it runs into the margin, and it never breaks. An optional argument passes `tcolorbox` keys.

```
\begin{overview}
This chapter introduces sequences and their limits.
\end{overview}
```

3.5. *The overview box*

This chapter introduces sequences and their limits.

Part 2



The parts of the book

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4 Table of contents

4.1 The grid

`\tableofcontents` prints the contents as a ruled grid. Each section is a row: a small label (SECTION 1A) above its title, and the page number in a column on the right. The chapter stands in a column left of the main divider, the part title hangs above its first row, and a chapter without sections gets a row of its own, with its label in the chapter column (in the front matter, before the first part, the row has no chapter column). Subsections are not listed. The rows break across pages; the vertical lines run on to the foot of each page, where a rule, the title of the document and the page number close it.

Test

The grid spans the text and the margin (`tocwidth`), so no change of geometry is needed around `\tableofcontents`. The title of a part hangs above its first row, its letters just reaching below the rule of that row (key `partshift`). The title and the rule under it start `partextend` left of the grid, in the margin, so that a title such as *Sequences and Series* fits on one line. Part titles are never hyphenated: a title too long for the space left of the main divider breaks between words into lines that stack upwards. The title may run over the label of the first chapter of the part, which stands further below the rule, as long as no letter of it reaches down to the label (a descender such as that of a *p* or a *y* over the label would); otherwise the space for the title ends before the label. The label is measured as it is set in its column, so a label broken into two short lines takes less room than its full length. A rule closes the last row (the chapter column too, when the last row has one), and the vertical lines run on below it to the foot of the page. The label of every chapter stands a little below the label of its first section (key `tocchaptershift`), clear of a part title above it. When a chapter continues on a new page, its label is repeated in the first row there; this needs one run more than the contents themselves. After the contents the page style that was active before is restored.

4.2 Keys

`toclabel`
: a label above the first row, at the right of the space left of the main divider; empty for none [empty]

`tocsectionlabel, tocchapterlabel`
: the word before a section or chapter number [`Section`, `Chapter`]; empty for the number alone

`tocfooter`
: the text at the foot of each page [the `\title`]

`tocwidth`
: width of the grid [the text and the margin]

`tocsplit, tocsubsplit`
: x of the main divider and of the chapter column [half and a quarter of the grid]

`tocpagewidth`
: width of the page-number column [`10mm`]

`tocpad, tocchapterpad`
: space next to the rules [`2mm`, `4mm`]

`partshift`
: raises (+) or lowers (-) the title of a part against the rule under it [`-1.2mm`]

`partextend`
: how far the title of a part and the rule under it start left of the grid [`12mm`]

`partgap`
: the space between the title of a part and the label of its first chapter, and the least space between the title of a part and the title of the part before it; when the rows of that part are too low, its chapter column is lengthened [`3mm`]

`partskip`
: space added above the title of every part after the first [`3mm`]

`tocchaptershift`
: how far the label of a chapter stands below the label of its first section [`1.5mm`]

`toclabelraise`
: how far the label above the first row, when there is one, stands above its rule [`5mm`]

`tocpartcolor`
: the colour of the part titles, a little lighter than the accent so that they stay behind the rows they hang over [`gbaccent!85`]

`tocrule, tocrulegap`
: thickness of the rules, and the gap left on each side of the main divider [`0.5pt`, `0.8mm`]

`toctoppad, tocbottompad, tocplainpad`
: padding of a row with and without a label [`2.6mm`, `2.2mm`, `2.6mm`]

`toctopspace, tocfootgap`
: space above the first rule, and from the last rule to the footer [`8mm`, `5mm`]

`toc=classic` gives back the two-column contents of greenbook 1.x.

4.3 Part pages

With `parttoc=true` the part page lists the chapters of the part, with their numbers and pages, as the part pages of this manual do. The list is a small version of the grid: hairlines between the rows, the chapter label in the label font, the title and the page in the fonts of the contents. The list is read from the `.toc` file while the contents are typeset, so it needs `\tableofcontents` before the first `\part`, every `\part` numbered, and a second run.

5 Chapter heads and the cover

5.1 Chapter heads

Every chapter head has the same parts: a band of the accent colour across the top of the paper, the title, and a rule under it that runs from the text into the margin. A numbered chapter has its number, in Riesling (or the chapter font in italic), at the right end of the rule, standing on it; the title is set beside it, as wide as the text and the margin allow, without hyphenation, and its last line stands on the rule too. `\chapter*` and the chapters of the front and back matter get the same head without the number, as the chapter *About this manual* shows.

The title is set with the keys `chaptertitlefont` and `chaptertitlesize` (`displayfont` at 36 pt), the number with `chapternumberfont` and `chapternumbersize` (`numberfont` at 144 pt). The number is in the accent colour. `\afterchapskip` is the space after the rule.

5.2 The cover

`\maketitle` makes a cover after the part pages of `artbook.sty`: the page in the accent colour, a small square logo in the top left corner, the title large in the chapter font, and author and date at the foot between two rules. `\subtitle{...}` adds a line under the title. The title page of this manual is such a cover. Use it inside `titlingpage`, or on its own; it takes a page of its own either way.

6 Other features

6.1 Layout

The stock is 210 × 260 mm, trimmed to 90 %. The design is one-sided: every page has the narrow margin on the left and the wide margin on the right, which holds footnotes, notes and the labels of the boxes. `twoside` is therefore switched off, and `\newgeometry` gives every page the margins it is given (greenbook adds geometry's `asymmetric`). `\part` sets its page with centred margins; `\spart{title}`, from greenbook 1.x, is the same as `\part{title}`. The environment `fullwidth` runs text over the margin.

6.2 Running heads

Every page outside the chapter openings, part pages and the contents has a head at the left of the text with the current section (the chapter before its first section), for example *2.1. The Physical Quantities*, and a bar in the accent colour along the outer edge of the paper, with the page number at its top and the title of the chapter reading down it in the label font (as in artbook).

`marginbar = true | false`
: draw the bar. Default `true`. With `false` the page number moves into the head, before the section and a grey rule: **6** | *2.1. The Physical Quantities*. The head stays inside the text block either way.

`marginbarwidth =` ⟨*length*⟩
: the width of the bar. Default `7mm`.

The text on the bar is set with the keys `marginbarfont` and `marginbarsize` (label; 7 pt), in the colour `gbbarink`. Its default is `gbpaper`, the off-white (`#F5F6F4`) that also fills the example boxes; either can be changed, for instance with `\colorlet{gbbarink}{white}`.

6.3 Notes

`\footnote{text}` is a numbered note in the margin (with `footnotes=margin`)[1]; in

[1] Like this one: the number is repeated at its start, and the text is ragged right in the note font.

running text it is a `\marginpar`, so notes that fall on the same lines are stacked, and inside boxes it is a `\marginnote`. `\footnote[offset]{text}` always uses `\marginnote` and moves the note down by the offset. `\marginnote{text}[offset]`, `\marginpar` and `\sidenote` (the same as `\marginpar`) set their text in the same style.

```
A sentence with a margin note.\marginnote{A \cs{marginnote},
  level
with its line.}  Another with a side note.\sidenote{A
  \cs{sidenote}, stacked
below the note above it if they would meet.}
```

A sentence with a margin note. Another with a side note.

A `\marginnote`, level with its line.
A `\sidenote`, stacked below the note above it if they would meet.

6.4 The margin

The margin holds the labels of the boxes, notes (`\marginpar`, `\marginnote`, the footnotes) and margin floats. greenbook keeps them apart: the place of each one is written to the `.aux` file, and on the next run each one is moved down until it is clear of the ones before it on its page, a label by moving its box down. A note or a margin float that would run below the text is moved up instead, as far as the ones above it allow. The places settle over a few runs, so latexmk needs `$max_repeat = 10;` in its `.latexmkrc`. A margin float taller than the room left on its page still runs off it, and a box moved down leaves space in the text: moving the float in the source gives a better page. memoir's `marginfigure` and `margintable` hang down from the line they are given at.

6.5 Figures and captions

With `captions=margin` the caption of a figure or a table stands in the margin, its last line level with the foot of the float; a caption given before the content stands level with its top. For content wider than the text there are two environments:

`widefigure`
: a figure over the text and the margin, which floats (an optional argument gives the placement, as for `figure`); its caption stands below it, in the margin column, and with `[H]` beside the text that follows;

`widefigure*`
: the same, set where it stands; its caption goes into the margin beside the text that follows.

The environment `fullwidth` sets any material over the text and the margin. memoir's `sidecaption` environment also puts its caption in the margin. memoir's `marginfigure` and `margintable` are already in the margin, so their captions (and the captions of their `\subbottom`s) stand under them, ragged right. Outside floats,

`\captionof{figure}{text}` sets a numbered caption under what precedes it, and `\captionof*{figure}{text}` one without a number; both stay in place, so they work in minipages and boxes.

Every float accepts the placement `[H]` of `float`, which greenbook loads: the float is set exactly where it stands in the source, and its caption still goes into the margin. The `caption` package replaces the caption mechanism these rely on, so greenbook-macros no longer loads `subcaption`; memoir's `\subbottom` sets subfigures.

The examples below show each kind of float and caption, each after its source. (The floats float, so they may stand a little after their source.)

Figures and tables

```
\begin{figure}[ht]
\centering
\begin{tikzpicture}
  \draw[gbaccent, line width=1pt] (0,0) rectangle (5,2.4);
  \draw[gbaccent!50] (0,0) -- (5,2.4) (0,2.4) -- (5,0);
\end{tikzpicture}
\caption{A figure with its caption in the margin.}
\end{figure}
```

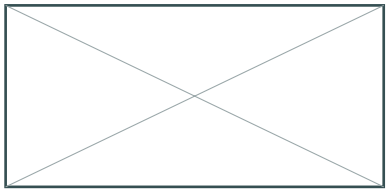

Figure 6.1. A figure with its caption in the margin.

```
\begin{table}[H]
\caption{A caption given first stands level with the top.}
\centering
\begin{tabular}{lcc}
\toprule
$n$ & $a_n$ & $\abs{a_n - a_{n-1}}$\\
\midrule
1 & 6.000000 & ---\\
2 & 6.083333 & 0.083333\\
3 & 6.082763 & 0.000571\\
\bottomrule
\end{tabular}
\end{table}
```

n	a_n	$\lvert a_n - a_{n-1}\rvert$
1	6.000000	—
2	6.083333	0.083333
3	6.082763	0.000571

Table 6.1. A caption given first stands level with the top.

```
\begin{figure}[H]
\centering
\subbottom[Square.]{\tikz\draw[gbaccent,thick] (0,0) rectangle
  (1.6,1.6);}
\qquad
\subbottom[Circle.]{\tikz\draw[gbaccent,thick] (0,0) circle
  (0.8);}
\caption{Two subfigures, with memoir's \cs{subbottom}.}
\end{figure}
```

`\subbottom` needs `\newsubfloat{figure}` in the preamble.



(a) Square. (b) Circle.

Figure 6.2. Two subfigures, with memoir's `\subbottom`.

Floats in the margin

```
\begin{marginfigure}
\centering
\tikz\draw[gbaccent,thick,->] (0,0) -- (2.4,1.2);
\caption{A \texttt{marginfigure}.}
\end{marginfigure}
\begin{margintable}
\centering\small
\begin{tabular}{cc}
\toprule $x$ & $x^2$\\ \midrule 1 & 1\\ 2 & 4\\ \bottomrule
\end{tabular}
\caption{A \texttt{margintable}.}
\end{margintable}
```

The figure and the table hang in the margin from the line where they are given, with their captions under them.

```
\begin{figure}[H]
\begin{sidecaption}{memoir's \texttt{sidecaption}: the caption
  beside
the figure, in the margin.}
```



Figure 6.3. A `marginfigure`.

x	x^2
1	1
2	4

Table 6.2. A `margintable`.

```
\centering
\tikz\fill[gbaccent!25] (0,0) rectangle (6,1.2);
\end{sidecaption}
\end{figure}
```


Figure 6.4. memoir's `sidecaption`: the caption beside the figure, in the margin.

Captions outside floats

```
\begin{center}
\tikz\draw[gbaccent,thick] (0,0) -- (1,1) -- (2,0) -- (3,1);
\captionof{figure}{A numbered caption with \cs{captionof}.}
\tikz\draw[gbaccent,thick] (0,1) -- (1,0) -- (2,1) -- (3,0);
\captionof*{figure}{An unnumbered one with \cs{captionof*}.}
\end{center}
```



Figure 6.5. A numbered caption with `\captionof`.



An unnumbered one with `\captionof*`.

Wide material

```
\begin{fullwidth}
\texttt{fullwidth} runs its text over the text block and the
  margin,
which suits a long display or a wide table:
\[
\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6},
\qquad \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n} = \ln 2,
\qquad \sum_{n=0}^{\infty} \frac{1}{n!} = \e,
\qquad \prod_{p} \frac{1}{1 - p^{-2}} = \frac{\pi^2}{6}.
\]
\end{fullwidth}
```

`fullwidth` runs its text over the text block and the margin, which suits a long display or a wide table:

$$\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}, \qquad \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n} = \ln 2, \qquad \sum_{n=0}^{\infty} \frac{1}{n!} = \mathrm{e}, \qquad \prod_{p} \frac{1}{1 - p^{-2}} = \frac{\pi^2}{6}.$$

```
\begin{widefigure}[ht]
\begin{tikzpicture}
  \draw[gbaccent, line width=1pt] plot[smooth, domain=0:17,
    samples=80]
    (\x, {0.9*sin(60*\x)});
\end{tikzpicture}
\caption{A floating \texttt{widefigure}: its caption stands
  below it, in
the margin column.}
\end{widefigure}
```



Figure 6.6. A floating `widefigure`: its caption stands below it, in the margin column.

```
\begin{widefigure*}
\begin{tikzpicture}
  \fill[gbaccent!12] (0,0) rectangle (17,2.6);
  \draw[gbaccent, line width=1pt] plot[smooth, domain=0:17,
    samples=80]
    (\x, {1.3+0.9*sin(40*\x)*exp(-0.08*\x)});
\end{tikzpicture}
\caption{A \texttt{widefigure*}: it spans the text and the
  margin, and its
caption stands beside the text after it.}
\end{widefigure*}
```

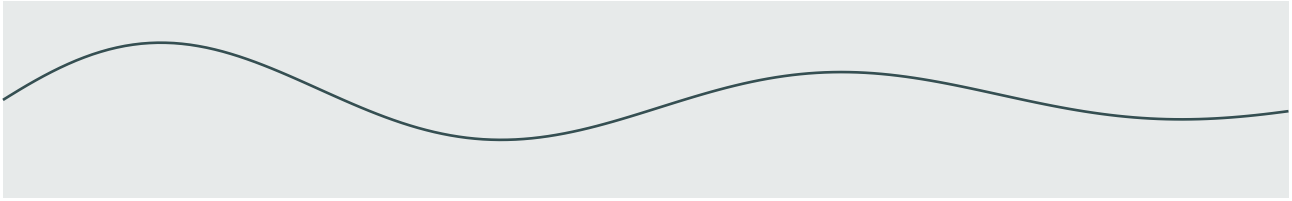

Figure 6.7. A `widefigure*`: it spans the text and the margin, and its caption stands beside the text after it.

This paragraph follows the wide figure, so the caption above stands in the margin beside it. The figure did not float; it is set where it is in the source.

6.6 Exercises

With the option `exercises`, `xsim` is loaded and set up: exercises are numbered within sections, `\printsolutionsbysection` prints all solutions with a heading per chapter

and section (the heading of a chapter gives its title, and is listed in the contents under the chapter that holds the solutions), and the environment `exc` sets a group of exercises under an *Exercises* heading. `exc` exists without the option too.

An exercise takes the `xsim` properties `subtitle` (in italics after the number) and `points` (in brackets at the right). Its `solution` follows it and is printed with the others by `\printsolutionsbysection`; this manual prints them in the last chapter.

```
\begin{exc}
\begin{exercise}[subtitle={Limits of sums}, points=2]
Show that if $a_n \to a$ and $b_n \to b$, then $a_n + b_n \to a
  + b$.
\end{exercise}
\begin{solution}
Given $\varepsilon > 0$, take $N$ with $\abs{a_n - a} <
  \varepsilon/2$ and
$\abs{b_n - b} < \varepsilon/2$ for $n \geq N$; the triangle
  inequality
does the rest.
\end{solution}
\begin{exercise}
Show that $\seqn{a}$ with $a_n = 1/n$ converges to $0$.
\end{exercise}
\begin{solution}
For $\varepsilon > 0$ take $N > 1/\varepsilon$.
\end{solution}
\end{exc}
```

Exercises

6.6.1. *Limits of sums* [2] Show that if $a_n \to a$ and $b_n \to b$, then $a_n + b_n \to a + b$.

6.6.2. Show that $(a_n)_{n=1}^{\infty}$ with $a_n = 1/n$ converges to 0.

Part 3



Reference

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7 Packages

greenbook loads the packages below, so a document does not load them again. Packages with options of their own are listed with them; to change the options of such a package, use its setup command after greenbook (`\hypersetup`, `\tcbset`, `\crefname`, `\microtypesetup`, `\setlist`, …) rather than loading it a second time, which ends in an option clash.

7.1 Always loaded

package	what greenbook uses it for
`iftex`	the check for LuaLaTeX or XeLaTeX
`amsmath`, `mathtools`	displays and alignments
`amsthm`, `thmtools`	the theorem environments (chapter 3)
`fontspec`	the text fonts (chapter 2)
`geometry`	the page layout, and `\newgeometry` (section 6.1)
`xcolor`	the colours, with `dvipsnames` (section 8.3)
`ragged2e`	ragged text in the margin notes and captions
`graphicx`, `calc`	the rotated text of the margin bar, lengths
`marginnote`	notes in boxes and notes with an offset
`zref-savepos`, `zref-abspage`, `etoolbox`	the place of each thing in the margin on its page (section 6.4)
`float`	the placement `[H]`: here, without floating
`tikz`	every drawing of the package: cover, chapter band, contents
`tcolorbox`	the theorem boxes, with the libraries `skins`, `breakable` and `hooks`
`needspace`	keeping the start of a box or of `exc` on one page
`pgfornament`	the ornament of the part pages
`multicol`	the two-column contents of `toc=classic`
`varwidth`	the width of a chapter label in the contents, as it is broken into lines
`enumitem`	lists (`\setlist` changes them)
`hyperref`	links, with `linktoc=page` (the contents link their page numbers) and `hyperfootnotes=false`
`cleveref`	`\cref`, with `nameinlink`; loaded after `hyperref`, as it must be
`microtype`	protrusion and font expansion (`factor=1100`, `stretch=10`, `shrink=10`)

`tikz` is always loaded, since `tcolorbox` draws the boxes with it, so a `tikzpicture`

needs nothing more. Only the libraries `tikz` loads by itself are present; others are added as usual, for example `\usetikzlibrary{arrows.meta, calc}`. The option `macros` adds `decorations.pathmorphing`, `tikz-cd` and `pgfplots`.

7.2 Loaded with the math setup

Each setup of section 2.2 loads its own packages:

setup	packages
`mtpro2`	`amssymb`, `mtpro2 [lite, zswash, subscriptcorrection]`, `mathalpha` (BOONDOX calligraphic, serif double-struck, ESSTIX fraktur, dutchcal script), `bm`, and `etoolbox` for a patch of the radicals
`newtx`	`amssymb`, `newtxmath`, `bm`
`cm`	`amssymb`, `bm`
`unicode`	`unicode-math`; `\bm` is defined as `\symbfit`, and `\blacksquare` and `\square` as in `amssymb`

7.3 Loaded with options

`exercises`
: `xsim` (section 6.6).

`macros`
: `greenbook-macros`, which loads `xargs`, `booktabs`, `import`, `transparent`, `pgfplots` (`compat=1.18`), `tikz-cd`, `centernot`, `cancel`, `braket`, `physics`, `siunitx` and `todonotes` (chapter 9).

7.4 Packages to avoid

`caption, subcaption`
: They replace the caption mechanism of memoir, which the captions in the margin rely on (section 6.5). memoir's `\subbottom` sets subfigures.

`\restylefloat, \floatnewfloat`
: `float` is loaded for `[H]`, but a float type it restyles or defines gets the captions of `float`, not those in the margin. `float` has its own `\newfloat`; greenbook keeps memoir's under that name, `\newfloat[chapter]{algo}{loa}{Algorithm}`, whose floats take `[H]` and margin captions, and leaves the one of `float` as `\floatnewfloat`.

`titlesec, titletoc, fancyhdr`
: memoir has its own commands for headings, contents and page styles, and greenbook sets them; these packages undo that.

`hyperref, cleveref`
: Already loaded; a second `\usepackage` with options fails.

8 Commands and environments

8.1 Commands

`\greenbooksetup{`⟨*keys*⟩`}`
sets the keys of the second group of section 1.2, in the preamble or in the document.

`\gbfont{`⟨*family*⟩`}[`⟨*features*⟩`]`
a font switch for the font keys (section 2.3).

`\gbfontelse{`⟨*family*⟩`}[`⟨*features*⟩`]{`⟨*fallback*⟩`}`
`\gbfont` when the font is installed, ⟨*fallback*⟩ otherwise.

`\spart{`⟨*title*⟩`}`
the same as `\part`, whose page has centred margins.

`\subtitle{`⟨*text*⟩`}`
a line under the title on the cover.

`\maketitle`
the cover (section 5.2).

`\gbkeep, \gbbreak`
the next box does not break, or may break (section 3.4).

`\captionof{`⟨*type*⟩`}{`⟨*text*⟩`}, \captionof*`
a caption outside a float, numbered or not (section 6.5).

`\footnote[`⟨*offset*⟩`]{`⟨*text*⟩`}`
a note in the margin, moved down by the offset.

`\marginnote{`⟨*text*⟩`}[`⟨*offset*⟩`], \marginpar, \sidenote`
notes in the margin, in the note font.

`\printsolutionsbysection`
all solutions, headed by chapter and section (with `exercises`).

`\ruledsec{`⟨*title*⟩`}`
the section head: the title over a hairline. greenbook passes it to memoir's `\setsecheadstyle`; it can also be used for a head of one's own.

`\prototype{`⟨*text*⟩`}`
the prototypical example of a section, in a tinted strip (section 3.2).

8.2 Environments

`definition, theorem, lemma, question, example, nonexample, corollary, remark, …`
the boxes of chapter 3.

`caution[⟨title⟩]`
a trap, in a box with a rule on the left (section 3.2).

`overview[⟨tcolorbox keys⟩]`
the summary box after a chapter head.

`fullwidth`
material over the text and the margin.

`widefigure[⟨placement⟩], widefigure*`
wide figures (section 6.5).

`exc`
a group of exercises under a heading.

8.3 Colours

colour	used for
`gbaccent`	bands, rules, tabs, numbers, the margin bar (key `accent`)
`slategreen`	the default accent, `#354F52`
`gbheading`	section and subsection titles
`hkgreen`	`#52796F`
`lightslategreen`	the overview box, the prototype strip, and (lightened) the fill of a definition
`lightslategreenborder`	the frame of the overview box, `#354F52`
`gbpaper`	the example boxes, text on the accent
`gbbarink`	text on the margin bar
`gbcoverink`	text on the cover
`gbdefpaper`	the fill of a definition, `lightslategreen!28`
`gbplum`	the tab and frame of a non-example, `#764C63`
`gbplumpaper`	the fill of a non-example, `#F1E9EE`
`gbcaution`	the rule and the label of a caution, `#7C6850`
`gbcautionpaper`	the fill of a caution, `#F1EDE9`
`goodpurple`	`#420024`

Each can be changed with `\colorlet`, for example `\colorlet{gbheading}{black}`.

9 The macros

The option `macros` loads `greenbook-macros`, the shorthands that greenbook 1.x loaded for every document. Several of its packages redefine common commands, so it is no longer loaded by default: `physics` changes `\div`, `\grad` and `\qty`, and its `\det` reads a following parenthesis as its argument, which breaks `\det(A)` inside the title of a box. The file can also be loaded on its own, after greenbook, with `\usepackage{greenbook-macros}`. This manual loads it, so the right-hand columns below are set with the macros themselves.

9.1 Number sets and alphabets

command	meaning	result
`\NN, ZZ, QQ, RR, CC, FF`	blackboard letters	$\mathbb{N}\ \mathbb{Z}\ \mathbb{Q}\ \mathbb{R}\ \mathbb{C}\ \mathbb{F}$
`\NNO, ZZO, RRO`	natural numbers with 0, non-negative integers and reals	$\mathbb{N}_0\ \mathbb{Z}_{\geq 0}\ \mathbb{R}_{\geq 0}$
`\kb, kg, kh, km, kn, kp, kq, ku, kz`	fraktur letters (Lie algebras, ideals)	$\mathfrak{b}\ \mathfrak{g}\ \mathfrak{h}\ \mathfrak{m}\ \mathfrak{n}\ \mathfrak{p}\ \mathfrak{q}\ \mathfrak{u}\ \mathfrak{z}$
`\SCF, SCG, SCH`	script letters	$\mathscr{F}\ \mathscr{G}\ \mathscr{H}$
`\catname{Set}`	the name of a category	Set

9.2 Sets, brackets and sequences

command	meaning	result
`\Set{x \given x>0}`	a set, with `braket`'s `\Set` sized by `\left`/`\right`	$\{x \mid x > 0\}$
`\given`	the bar of a set (`\mid`)	$\mid$
`\emptyset`	the empty set (as `\varnothing`)	$\varnothing$
`\union, intersect`	$\cup$ and $\cap$	$A \cup B \cap C$
`\floor{x}, ceil{x}`	floor and ceiling	$\lfloor x \rfloor$ $\lceil x \rceil$
`\cbrt{x}`	cube root	$\sqrt[3]{x}$
`\conj{z}`	complex conjugate	$\overline{z}$
`\seq{a}{n}`	a finite sequence (or a tuple)	$(a_1, a_2, \ldots, a_n)$
`\seqq{a_n}`	a sequence, in brackets sized to it	(a_n)
`\seqn{a}`	an infinite sequence	$(a_n)_{n=1}^{\infty}$
`\seqn[k][0]{x}`	the same, with index and start	$(x_k)_{k=0}^{\infty}$
`\many{a}{n}`	a product of indexed factors	$a_1 a_2 \cdots a_n$
`\avg{x}`	a mean (expectation) in angle brackets	$\langle x \rangle$
`\bavg{x}`	a mean with a bar	$\overline{x}$

9.3 Logic and relations

command	meaning	result
`\notiff`	a struck-through $\iff$	$\not\iff$
`\liff, lthen`	arrows of logic	$p \leftrightarrow q,\ p \to q$
`\defeq`	equal by definition	$\stackrel{\text{def}}{=}$
`\taking{f}`	an arrow with a label	$A \xrightarrow{f} B$
`\inv`	the exponent -1	f^{-1}
`\dg`	degrees	90°

`centernot` gives `\centernot`, a slash centred on an arrow: $\centernot\Rightarrow$.

9.4 Analysis and physics

command	meaning	result
`\e`	upright e	$\mathrm{e}^{i\theta}$
`\Re, Im`	real and imaginary part (operators)	$\operatorname{Re} z,\ \operatorname{Im} z$
`\dd[n]`	the d of a differential, tighter than `physics`'	$\int f\, dx$
`\vec{v}`	a bold vector	$\mathbf{v}$
`\uvec{n}`	a unit vector	$\hat{\mathbf{n}}$
`\ihat, jhat, khat`	the unit vectors	$\mathbf{i}\ \mathbf{j}\ \mathbf{k}$
`\rhat, that`	polar unit vectors	$\mathbf{e}_r\ \mathbf{e}_\theta$
`\curl{F}`	curl	$\nabla \times \mathbf{F}$
`\qty{9.81}{m/s^2}`	a quantity with a unit (`siunitx`'s `\SI`, replacing `physics`' `\qty`)	$9.81\,\mathrm{m/s^2}$

`physics` also provides `\abs`, `\norm`, `\bra`, `\ket`, `\dv`, `\pdv`, `\eval`, `\order`, `\mqty` and the rest of its commands, and `siunitx` `\num`, `\unit` and `\SI`.

9.5 Operators

Operators set upright, with the spacing of an operator:

`\Hom`	Hom	`\End`	End	`\Aut`	Aut
`\Inn`	Inn	`\Syl`	Syl	`\Gal`	Gal
`\GL`	GL	`\SL`	SL	`\Mor`	Mor
`\Ext`	Ext	`\Tor`	Tor	`\Spec`	Spec
`\Ker`	Ker	`\coker`	coker	`\id`	id
`\pr`	pr				
`\ord`	ord	`\sign`	sign	`\cis`	cis
`\dom`	dom	`\ran`	ran	`\ext`	ext
`\pred`	pred	`\diam`	diam	`\Vol`	Vol
`\lcm`	lcm	`\argmin`	arg min	`\argmax`	arg max

`\lcm`, `\argmin` and `\argmax` take limits below them in displays.

9.6 Olympiad inequalities and geometry

command	meaning	result
`\cycsum, symsum`	cyclic and symmetric sums	$\sum_{\text{cyc}} a^2,\ \sum_{\text{sym}} ab$
`\cycprod, symprod`	cyclic and symmetric products	$\prod_{\text{cyc}} a,\ \prod_{\text{sym}} a$
`\dang`	a directed angle	$\measuredangle ABC$
`\ray{AB}, seg{AB}`	ray and segment	$\overrightarrow{AB}\ \overline{AB}$
`\arc{AB}`	an arc (`\wideparen` with MathTime Pro 2)	$\overset{\frown}{AB}$

9.7 Short names

command	meaning	result
`\ol, ul`	`\overline`, `\underline`	$\overline{x}\ \underline{x}$
`\wt, wh`	`\widetilde`, `\widehat`	$\widetilde{G}\ \widehat{G}$
`\eps`	`\varepsilon`	ε
`\half`	one half	$\frac{1}{2}$
`\ts{th}`	superscript text	4th

9.8 Text, notes and environments

`\vocab{⟨word⟩}`
: the word in italics, and an index entry; `\tpvocab{topic}{word}` indexes it under a topic.

`\mailto{⟨address⟩}`
: a linked address in the mono font.

`\hrulebar[⟨width⟩]`
: a centred rule between paragraphs.

`\incfig[⟨folder⟩]{⟨name⟩}`
: a drawing exported from Inkscape as `name.pdf_tex`, from `../figures/` by default.

`\unsure, \change, \addstuff, \improvement`
: coloured `todonotes` (red, blue, green, plum); `\listoftodos` lists them.

`soln`
: a proof headed *Solution*, closed by a rule.

`subproof[⟨head⟩]`
: a proof inside a proof, ended by a black square.

`gobble`
: drops its content.

The ones that print something, each after its source:

```
A \vocab{limit point} of a sequence, and
  \mailto{lunalgia@proton.me}.
\hrulebar
Text after a \cs{hrulebar}.\unsure{Is this right?}
\addstuff{An example here.}
\begin{gobble}
This paragraph is dropped.
\end{gobble}
```

A *limit point* of a sequence, and lunalgia@proton.me.

Text after a `\hrulebar`.
`soln` and `subproof` are shown in section 3.2.

Is this right?

An example here.

Solutions to Exercises

The solutions of the exercises of section 6.6, as `\printsolutionsbysection` prints them.

Chapter 6 Other features

§6.6

Solution 6.6.1. Given $\varepsilon > 0$, take N with $|a_n - a| < \varepsilon/2$ and $|b_n - b| < \varepsilon/2$ for $n \geq N$; the triangle inequality does the rest.

Solution 6.6.2. For $\varepsilon > 0$ take $N > 1/\varepsilon$.

Changes from greenbook 1.x

- The framed boxes are `tcolorboxes` and may break across pages (`breakable`, `split`, `needspace`, `\gbkeep`, `\gbbreak`). The labels in the margin are drawn by the box, so they also work in the breakable boxes.
- The table of contents is the grid of `artbook.sty`; `toc=classic` keeps the old one. Part pages can list their chapters.
- Fonts and math fonts fall back to installed ones; `mtpro2`, Sabon, Jost, Riesling and JetBrains Mono are no longer required.
- `xsim` and the shorthands are loaded only with the options `exercises` and `macros`; `l` as ℓ only with `ell`.
- `theorem*` is boxed like `theorem`. `proposition` and `claim` use the `plain` style (1.x asked for a style `basehead` that does not exist, and `thmtools` fell back to `plain`).
- Removed: the ASCII banners, `blindtext`, `pdfpages`, `xifthen`, `ifoddpage`, `fmtcount`, the second `\setsidecaps`, a patch of an internal `fontspec` function, `parlist` (it needed `paralist`, which was not loaded), and the 20 em space below remarks.
- New chapter heads: the number stands on the rule, the title may use the margin, no box is overfull, and `\chapter*` and the front and back matter have the same head without a number (1.x printed the number of the previous chapter in `\chapter*`). The chapter style is called `greenbook`; `custom` still works. `\chnumsep` is no longer used.
- `\maketitle` makes a coloured cover (`cover`).
- The tab of an example is drawn as part of the frame.
- Four font families for the parts of the page (`headingfont`, `labelfont`, `displayfont`, `numberfont`), a font and a size key for every part, `\gbfont`, and an `accent` key.
- The running head is the same on every page and stays inside the text block (in 1.x the head of odd pages ran off the paper).
- Footnotes and margin notes share one style; footnotes in running text are stacked with `\marginpar`.
- Captions in the margin, `widefigure`, `widefigure*` and `\captionof`.

- The contents span the text and the margin, close with a rule, and repeat the label of a chapter that continues on a new page; the part pages list their chapters in the same design.
- Section titles no longer leave their colour on the text that follows.
- Section heads, the part page and `exc` are built without the spaces, `~\\` and negative skips they relied on; the foot skip is no longer negative.

Changes in 2.1

- The fonts of the parts of the page default to Jost Light (section titles), Jost Medium (box names, tabs, remark heads, caption labels), DINdong (labels, section numbers) and PP Mori Semibold (part titles in the contents), each with the old family as its fallback (`\gbfontelse`).
- The paragraph after a box is no longer indented (`indentafterbox`).
- `corollary` and `corollary*` use the `plain` style.
- Contents: no label above the grid by default; part titles at 20 pt, never hyphenated, starting with their rule `partextend` left of the grid, with `partskip` more space above them, and running over the label of the first chapter when they do not touch it.
- greenbook-macros: sequences are in round brackets (`\seq`, `\seqq`), and `\seqn` gives $(a_n)_{n=1}^{\infty}$. `\e` has no space before it. Removed, as unused, duplicated or wrong: `\cross`, `\vnabla` (both redefinitions of `physics`), `\dtp`, `\ovec`, `\increment`, `\minusspace`, `\diffd`, `\cgiven`, `\colvec`, `\listvec` (now `\seq`), `\manys` (it had no comma before the dots), `\im` (an upright iota), `\charin`, `\SC`, `\Img` (the same as `\Im`), `\Coker`, `\ndiv`, `\nddiv`, `\alert`, `\plusemail` and `\ii`.
- The manual is set in greenbook's default fonts and shows every environment after its source, the exercises with their solutions.

Changes since 2.1

- `definition` has its own style, `hangingdef`: the box is tinted (`gbdefpaper`) and its frame is thinner, so that it reads apart from a theorem. Its box style is `gb/definition`.
- New environment `nonexample`: an example box in plum (`gbplum`, `gbplumpaper`), numbered with the examples and referred to by `\cref` as a non-example.
- New environment `caution` and new command `\prototype` (section 3.2).

- New colours `gbdefpaper`, `gbplum`, `gbplumpaper`, `gbcaution` and `gbcautionpaper`, at about the saturation of `slategreen`, so that the warm boxes stay in the palette.