Abstract

This package provides a flexible and easy interface to page dimensions. You can change the page layout with intuitive parameters. For instance, if you want to set a margin to 2cm from each edge of the paper, you can type just \usepackage[margin=2cm]{geometry}. The page layout can be changed in the middle of the document with \newgeometry command.

1 Preface to version 5

- Changing page layout mid-document.
  The new commands \newgeometry{···} and \restoregeometry allow users to change page dimensions in the middle of the document. \newgeometry is almost similar to \geometry except that \newgeometry disables all the options specified in the preamble and skips the papersize-related options: landscape, portrait and paper size options (such as papersize, paper=a4paper and so forth).

- A new set of options to specify the layout area.
  The options specified for the area, in which the page dimensions are calculated, are added: layout, layoutsize, layoutwidth, layoutheight and so forth. These options would help to print the specified layout to a different sized paper. For example, with a4paper and layout=a5paper, the geometry package uses ‘A5’ layout to calculate margins with the paper size still ‘A4’.

- A new driver option xetex.
  The new driver option xetex is added. The driver auto-detection routine has been revised so as to avoid an error with undefined control sequences. Note that ‘geometry.cfg’ in \TeX\ Live, which disables the auto-detection routine and sets pdftex, is no longer necessary and has no problem even though it still exists. To set xetex is strongly recommended with \Xe\TeX.\n
- New paper size presets for JIS B-series and ISO C-series.
  The papersize presets b0j to b6j for JIS (Japanese Industrial Standards) B-series and c0paper to c6paper for ISO C-series (v5.4~) are added.

- Changing default for underspecified margin.
  In the previous version, if only one margin was specified, bottom=1cm for example, then geometry set the other margin with the margin ratio (1:1 by default for the vertical dimensions) and got top=1cm in this case. The version 5 sets the text-body size with the default scale (= 0.7) and determine the unspecified margin. (See Section 6.5)

- The option showframe and showcrop works on every page.
  With showframe option, the page frames are shown on every page. In addition, a new option showcrop prints crop marks at each corner of layout area on every page. Note that the marks would be invisible without specifying the layout size smaller than paper size. Version 5.4 introduced a new \shipout overloading process using atbegshi package, so the atbegshi package is required when showframe or showcrop option is specified.

- Loading geometry.cfg precedes processing class options.
  The previous version loaded geometry.cfg after processing the document class options. Now that the config file is loaded before processing the class options, you can change the behavior specified in geometry.cfg by adding options into \documentclass as well as \usepackage and \geometry.
2 Introduction

To set dimensions for page layout in \LaTeX{} is not straightforward. You need to adjust several \LaTeX{} native dimensions to place a text area where you want. If you want to center the text area in the paper you use, for example, you have to specify native dimensions as follows:

\begin{verbatim}
\usepackage{calc}
\setlength{\textwidth}{7in}
\setlength{\textheight}{10in}
\setlength{\oddsidemargin}{(\paperwidth-\textwidth)/2 - 1in}
\setlength{\topmargin}{(\paperheight-\textheight - \headheight - \headsep - \footskip)/2 - 1in}.
\end{verbatim}

Without package \texttt{calc}, the above example would need more tedious settings. Package \texttt{geometry} provides an easy way to set page layout parameters. In this case, what you have to do is just

\begin{verbatim}
\usepackage[text={7in,10in},centering]{geometry}
\end{verbatim}

Besides centering problem, setting margins from each edge of the paper is also troublesome. But \texttt{geometry} also make it easy. If you want to set each margin to 1.5in, you can type

\begin{verbatim}
\usepackage[margin=1.5in]{geometry}
\end{verbatim}

Thus, the geometry package has an auto-completion mechanism, in which unspecified dimensions are automatically determined. The \texttt{geometry} package will be also useful when you have to set page layout obeying the following strict instructions: for example,

\begin{quote}
The total allowable width of the text area is 6.5 inches wide by 8.75 inches high. The top margin on each page should be 1.2 inches from the top edge of the page. The left margin should be 0.9 inch from the left edge. The footer with page number should be at the bottom of the text area.
\end{quote}

In this case, using \texttt{geometry} you can type

\begin{verbatim}
\usepackage[total={6.5in,8.75in},
           top=1.2in, left=0.9in, includefoot]{geometry}
\end{verbatim}

Setting a text area on the paper in document preparation system has some analogy to placing a window on the background in the window system. The name 'geometry' comes from the \texttt{-geometry} option used for specifying a size and location of a window in X Window System.

3 Page geometry

Figure 1 shows the page layout dimensions defined in the \texttt{geometry} package. The page layout contains a total body (printable area) and margins. The total body consists of a body (text area) with an optional header, footer and marginal notes (marginpar). There are four margins: left, right, top and bottom. For twosided documents, horizontal margins should be called inner and outer.

\begin{verbatim}
paper : total body and margins
total body : body (text area) (optional head, foot and marginpar)
margins : left (inner), right (outer), top and bottom
\end{verbatim}

Each margin is measured from the corresponding edge of a paper. For example, left margin (inner margin) means a horizontal distance between the left (inner) edge of the paper and that of the total body. Therefore the left and top margins defined in \texttt{geometry} are different from the native dimensions \texttt{\leftmargin} and \texttt{\topmargin}. The size of a body (text area) can be modified by \texttt{\textwidth} and \texttt{\textheight}. The dimensions for paper, total body and margins have the following relations.

\begin{align}
\text{paperwidth} &= \text{left} + \text{width} + \text{right} \quad (1) \\
\text{paperheight} &= \text{top} + \text{height} + \text{bottom} \quad (2)
\end{align}
Figure 1: Dimension names used in the geometry package. width = textwidth and height = textheight by default. left, right, top and bottom are margins. If margins on verso pages are swapped by twoside option, margins specified by left and right options are used for the inside and outside margins respectively. inner and outer are aliases of left and right respectively.

Figure 2: includehead and includefoot include the head and foot respectively into total body. (a) height = textheight (default). (b) height = textheight + headheight + headsep + footskip if includehead and includefoot. If the top and bottom margins are specified, includehead and includefoot result in shorter textheight.

The total body width and height would be defined:

\[
width := \text{textwidth} + \text{marginparsep} + \text{marginparwidth} \tag{3}
\]
\[
height := \text{textheight} + \text{headheight} + \text{headsep} + \text{footskip} \tag{4}
\]

In Equation (3) width := textwidth by default, while marginparsep and marginparwidth are included in width if includemp option is set true. In Equation (4), height := textheight by default. If includehead is set to true, headheight and headsep are considered as a part of height. In the same way, includefoot takes footskip into height. Figure 2 shows how these options work in the vertical direction.

Thus, the page layout consists of three parts (lengths) in each direction: one body and two margins. If the two of them are explicitly specified, the other length is obvious and no need to be specified. Figure 3 shows a simple model of page dimensions. When a length L is given and is partitioned into the body b, the margins a and c, it’s obvious that

\[
L = a + b + c \tag{5}
\]

The specification with two of the three (a, b, and c) fixed explicitly is solvable. If two or more are left unspecified or ‘underspecified’, Equation (5) cannot be solved without any other relation between them. If all of them are specified, then it needs to check whether or not they satisfy Equation (5), that is too much specification or ‘overspecified’.
The geometry package has auto-completion mechanism that saves the trouble of specifying the page layout dimensions. For example, you can set
\usepackage[width=14cm, left=3cm]{geometry}
on A4 paper. In this case you don’t have to set the right margin. The details of auto-completion will be described in Section 6.5.

4 User interface

4.1 Commands

The geometry package provides the following commands:

- \geometry{⟨options⟩}
- \newgeometry{⟨options⟩} and \restoregeometry
- \savegeometry{⟨name⟩} and \loadgeometry{⟨name⟩}

\geometry{⟨options⟩} changes the page layout according to the options specified in the argument. This command, if any, should be placed only in the preamble (before \begin{document}).

The geometry package may be used as part of a class or another package you use in your document. The command \geometry can overwrite some of the settings in the preamble. Multiple use of \geometry is allowed and then processed with the options concatenated. If geometry is not yet loaded, you can use only \usepackage[⟨options⟩]{geometry} instead of \geometry.

\newgeometry{⟨options⟩} changes the page layout mid-document. \newgeometry is almost similar to \geometry except that \newgeometry disables all the options specified by \usepackage and \geometry in the preamble and skips papersize-related options. \restoregeometry restores the page layout specified in the preamble. This command has no arguments. See Section 7 for details.

\savegeometry{⟨name⟩} saves the page dimensions as ⟨name⟩ where you put this command. \loadgeometry{⟨name⟩} loads the page dimensions saved as ⟨name⟩. See Section 7 for details.

4.2 Optional argument

The geometry package adopts keyval interface ‘⟨key⟩=⟨value⟩’ for the optional argument to \usepackage, \geometry and \newgeometry.

The argument includes a list of comma-separated keyval options and has basic rules as follows:

- Multiple lines are allowed, while blank lines are not.
- Any spaces between words are ignored.
- Options are basically order-independent. (There are some exceptions. See Section 6.2 for details.)

For example,
\usepackage[ a5paper , hmargin = { 3cm, .8in } , height = 10in ]{geometry}
is equivalent to
\usepackage[height=10in,a5paper,hmargin={3cm,0.8in}]{geometry}

Some options are allowed to have sub-list, e.g. ⟨3cm,0.8in⟩. Note that the order of values in the sub-list is significant. The above setting is also equivalent to the followings:
\usepackage{geometry}
\geometry{height=10in,a5paper,hmargin=\{3cm,0.8in\}}

or

\usepackage[a5paper]{geometry}
\geometry{hmargin=\{3cm,0.8in\},height=8in}
\geometry{height=10in}.

Thus, multiple use of \texttt{geometry} just appends options. \texttt{geometry} supports package \texttt{calc}\textsuperscript{1}. For example,

\usepackage{calc}
\usepackage[textheight=20\baselineskip+10pt]{geometry}

4.3 Option types

\texttt{geometry} options are categorized into four types:

1. **Boolean type**
   
s takes a boolean value (\texttt{true} or \texttt{false}). If no value, \texttt{true} is set by default.
   \[
   \langle key \rangle = true \mid false.
   \]
   \langle key \rangle with no value is equivalent to \langle key \rangle = true.
   
   \textbf{Examples:} verbose=true, includehead, twoside=false.
   
2. **Single-valued type**
   
s takes a mandatory value.
   \[
   \langle key \rangle = \langle value \rangle.
   \]
   
   \textbf{Examples:} width=7in, left=1.25in, footskip=1cm, height=.86\paperheight.
   
3. **Double-valued type**
   
s takes a pair of comma-separated values in braces. The two values can be shortened to one value if they are identical.
   \[
   \langle key \rangle = \{\langle value1 \rangle,\langle value2 \rangle\}.
   \]
   \langle key \rangle = \langle value \rangle is equivalent to \langle key \rangle = \{\langle value \rangle,\langle value \rangle\}.
   
   \textbf{Examples:} hmargin=\{1.5in,1in\}, scale=0.8, body=\{7in,10in\}.
   
4. **Triple-valued type**
   
s takes three mandatory, comma-separated values in braces.
   \[
   \langle key \rangle = \{\langle value1 \rangle,\langle value2 \rangle,\langle value3 \rangle\}
   \]
   
   Each value must be a dimension or null. When you give an empty value or ‘\texttt{*}’, it means null and leaves the appropriate value to the auto-completion mechanism. You need to specify at least one dimension, typically two dimensions. You can set nulls for all the values, but it makes no sense.
   
   \textbf{Examples:}
   
   hdivide=\{2cm,*,1cm\}, vdivide=\{3cm,19cm, \}, divide=\{lin,*,1in\}.

5 Option details

This section describes all options available in \texttt{geometry}. Options with a dagger \textsuperscript{†} are not available as arguments of \texttt{\newgeometry} (See Section 7).

\textsuperscript{1}CTAN: macros/latex/required/tools
5.1 Paper size

The options below set paper/media size and orientation.

- **paper | papernam**e specifies the paper size by name. `paper=(paper-name)`. For convenience, you can specify the paper name without `paper=`. For example, `a4paper` is equivalent to `paper=a4paper`.

- **a0paper, a1paper, a2paper, a3paper, a4paper, a5paper, a6paper,**
  - **b0paper, b1paper, b2paper, b3paper, b4paper, b5paper, b6paper,**
  - **c0paper, c1paper, c2paper, c3paper, c4paper, c5paper, c6paper,**
  - **b0j, b1j, b2j, b3j, b4j, b5j, b6j,**
  - **ansiapaper, ansibpaper, ansicpaper, ansidpaper, ansiepaper,**
  - **letterpaper, executivepaper, legalpaper** specifies paper name. The value part is ignored even if any. For example, the followings have the same effect:
    - `a5paper`
    - `a5paper=true`
    - `a5paper=false`
    - and so forth.

- **a[0-6]paper, b[0-6]paper** and **c[0-6]paper** are ISO A, B and C series of paper sizes respectively. The JIS (Japanese Industrial Standards) A-series is identical to the ISO A-series, but the JIS B-series is different from the ISO B-series. `b[0-6]j` should be used for the JIS B-series.

- **screen** a special paper size with `(W,H) = (225mm,180mm)`. For presentation with PC and video projector, “screen,centering” with ‘slide’ documentclass would be useful.

- **paperwidth** width of the paper. `paperwidth=(length)`.

- **paperheight** height of the paper. `paperheight=(length)`.

- **papersize** width and height of the paper. `papersize={(width),(height)}` or `papersize=(length)`.

- **landscape** switches the paper orientation to landscape mode.

- **portrait** switches the paper orientation to portrait mode. This is equivalent to `landscape=false`.

The options for paper names (e.g., `a4paper`) and orientation (`portrait` and `landscape`) can be set as document class options. For example, you can set \documentclass[a4paper,landscape]{article}, then `a4paper` and `landscape` are processed in `geometry` as well. This is also the case for `twoside` and `twocolumn` (see also Section 5.5).

5.2 Layout size

You can specify the layout area with options described in this section regardless of the paper size. The options would help to print the specified layout to a different sized paper. For example, with `a4paper` and `layout=a5paper`, the package uses ‘A5’ layout to calculate margins on ‘A4’ paper. The layout size defaults to the same as the paper. The options for the layout size are available in `\newgeometry`, so that you can change the layout size in the middle of the document. The paper size itself can’t be changed though. Figure 4 shows what the difference between `layout` and `paper` is.

- **layout** specifies the layout size by paper name. `layout=(paper-name)`. All the paper names defined in `geometry` are available. See Section 5.1 for details.

- **layoutwidth** width of the layout. `layoutwidth=(length)`.

- **layoutheight** height of the layout. `layoutheight=(length)`.

- **layoutsize** width and height of the layout. `layoutsize={(width),(height)}` or `layoutsize=(length)`.

- **layoutoffset** specifies the horizontal offset from the left edge of the paper. `layoutoffset=(length)`.

- **layoutvoffset** specifies the vertical offset from the top edge of the paper. `layoutvoffset=(length)`.

- **layoutoffset** specifies both horizontal and vertical offsets. `layoutoffset={(hoffset),(voffset)}` or `layoutsize=(length)`.

5.3 Body size

The options specifying the size of `total body` are described in this section.

- **hscale** ratio of width of `total body` to `\paperwidth`. `hscale=(h-scale)`, e.g., `hscale=0.8` is equivalent to `width=0.8\paperwidth`. (0.7 by default)
Figure 4: The dimensions related to the layout size. Note that the layout size defaults to the same size as the paper, so you don’t have to specify layout-related options explicitly in most cases.

vscale ratio of height of total body to \textwidth, e.g., vscale=⟨v-scale⟩. (0.7 by default) 
vscale=0.9 is equivalent to height=0.9\paperheight.

scale ratio of total body to the paper. scale={⟨h-scale⟩,⟨v-scale⟩} or scale=⟨scale⟩. (0.7 by default)

width | totalwidth
-----|-----------------------
width of total body. width=⟨length⟩ or totalwidth=⟨length⟩. This dimension defaults to textwidth, but if includemp is set to true, width ≥ textwidth because width includes the width of the marginal notes. If textwidth and width are specified at the same time, textwidth takes priority over width.

height | totalheight
-----|-----------------------
height of total body, excluding header and footer by default. If includehead or includefoot is set, height includes the head or foot of the page as well as textheight. height=⟨length⟩ or totalheight=⟨length⟩. If both textheight and height are specified, height will be ignored.

total
-----
width and height of total body.

\textwidth, \textheight
-----
\textwidth=⟨length⟩ or total=⟨length⟩. 
\textheight specifies \textheight, the width of body (the text area). \textwidth=⟨length⟩.

\textwidth specifies \textheight, the height of body (the text area). \textheight=⟨length⟩.

body
-----
\textwidth, \textheight
-----
\textwidth=⟨length⟩ or text=⟨length⟩.

body specifies both \textwidth and \textheight of the body of page.

\textwidth=⟨length⟩, \textheight
-----
\textwidth=⟨length⟩, \textheight.

\textwidth
-----
\textwidth=⟨length⟩.

\lines enables users to specify \textheight by the number of lines. lines=⟨integer⟩.

\includehead includes the head of the page, \headheight and \headsep, into total body. It is set to false by default. It is opposite to ignorehead. See Figure 2 and Figure 5.

\includefoot includes the foot of the page, \footskip, into total body. It is opposite to ignorefoot. It is false by default. See Figure 2 and Figure 5.

\includeheadfoot sets both includehead and includefoot to true, which is opposite to ignoreheadfoot. See Figure 2 and Figure 5.

\includeall sets both includeheadfoot and includemp to true. See Figure 5.

\ignorehead disregards the head of the page, headheight and headsep, in determining vertical layout, but does not change those lengths. It is equivalent to includehead=false. It is set to true by default. See also includehead.

\ignorefoot disregards the foot of page, footskip, in determining vertical layout, but does not change that length. This option defaults to true. See also includefoot.

\ignoreheadfoot sets both ignorehead and ignorefoot to true. See also includeheadfoot.
Figure 5: Sample layouts for total body with different switches. (a) includeheadfoot, (b) includeall, (c) includefoot and (d) includefoot,includemp. If reversemp is set to true, the location of the marginal notes are swapped on every page. Option twoside swaps both margins and marginal notes on verso pages. Note that the marginal note, if any, is printed despite ignoremp or includemp=false and overrun the page in some cases.

ignoremp disregards the marginal notes in determining the horizontal margins (defaults to true). If marginal notes overrun the page, the warning message will be displayed when verbose=true. See also includemp and Figure 5.

ignoreall sets both ignoreheadfoot and ignoremp to true. See also includeall.

heightrounded This option rounds \texttheight to n-times (n: an integer) of \baselineskip plus \topskip to avoid “underfull vbox” in some cases. For example, if \texttheight is 486pt with \baselineskip 12pt and \topskip 10pt, then

\[ (39 \times 12pt + 10pt =) 478pt < 486pt < 490pt \ (= 40 \times 12pt + 10pt), \]

as a result \texttheight is rounded to 490pt. heightrounded=false by default.

Figure 5 illustrates various layouts with different layout modes. The dimensions for a header and a footer can be controlled by nohead or nofoot mode, which sets each length to 0pt directly. On the other hand, options with the prefix ignore do not change the corresponding native dimensions.

The following options can specify body and margins simultaneously with three comma-separated values in braces.

heightrounded This option rounds \texttheight to n-times (n: an integer) of \baselineskip plus \topskip to avoid “underfull vbox” in some cases. For example, if \texttheight is 486pt with \baselineskip 12pt and \topskip 10pt, then

\[ (39 \times 12pt + 10pt =) 478pt < 486pt < 490pt \ (= 40 \times 12pt + 10pt), \]

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Figure 5 illustrates various layouts with different layout modes. The dimensions for a header and a footer can be controlled by nohead or nofoot mode, which sets each length to 0pt directly. On the other hand, options with the prefix ignore do not change the corresponding native dimensions.

The following options can specify body and margins simultaneously with three comma-separated values in braces.

hdivide horizontal partitions (left,width,right). hdivide={⟨left margin⟩,⟨width⟩,⟨right margin⟩}. Note that you should not specify all of the three parameters. The best way of using this option is to specify two of three and leave the rest with null(nothing) or ‘*’.

For example, when you set hdivide={2cm,15cm, }, the margin from the right-side edge of page will be determined calculating paperwidth-2cm-15cm.
vdivide          vertical partitions (top, height, bottom). \texttt{vdivide=\{top margin\},\{height\},\{bottom margin\}).
divide           divide=\{A, B, C\} is interpreted as \texttt{hdivide=\{A, B\}} and \texttt{vdivide=\{A, B, C\}}.

5.4 Margin size

The options specifying the size of the margins are listed below.

\texttt{left | lmargin | inner}  
left margin (for oneside) or inner margin (for twoside) of total body. In other words, the distance between the left (inner) edge of the paper and that of total body. \texttt{left=\{length\}}. inner has no special meaning, just an alias of left and lmargin.

\texttt{right | rmargin | outer}  
right or outer margin of total body. \texttt{right=\{length\}}.

top | tmargin  
top margin of the page. \texttt{top=\{length\}}. Note this option has nothing to do with the native dimension \texttt{\topmargin}.

\texttt{bottom | bmargin}  
bottom margin of the page. \texttt{bottom=\{length\}}.

\texttt{hmargin}  
left and right margin. \texttt{hmargin=\{\{left margin\},\{right margin\}\}} or \texttt{hmargin=\{length\}}.

\texttt{vmargin}  
top and bottom margin. \texttt{vmargin=\{\{top margin\},\{bottom margin\}\}} or \texttt{vmargin=\{length\}}.

\texttt{margin}  
margin=\{A, B\} is equivalent to \texttt{hmargin=\{A, B\}} and \texttt{vmargin=\{A, B\}}. margin=A is automatically expanded to \texttt{hmargin=A} and \texttt{vmargin=A}.

\texttt{hmarginratio}  
horizontal margin ratio of \texttt{left} (inner) to \texttt{right} (outer). The value of \texttt{\{ratio\}} should be specified with colon-separated two values. Each value should be a positive integer less than 100 to prevent arithmetic overflow, e.g., 2:3 instead of 1:1.5. The default ratio is 1:1 for oneside, 2:3 for twoside.

\texttt{vmarginratio}  
vertical margin ratio of \texttt{top} to \texttt{bottom}. The default ratio is 2:3.

\texttt{marginratio | ratio}  
horizontal and vertical margin ratios. \texttt{marginratio=\{\{horizontal ratio\},\{vertical ratio\}\}} or \texttt{marginratio=\{ratio\}}.

\texttt{hcentering}  
sets auto-centering horizontally and is equivalent to \texttt{hmarginratio=1:1}. It is set to true by default for oneside. See also \texttt{hmarginratio}.

\texttt{vcentering}  
sets auto-centering vertically and is equivalent to \texttt{vmarginratio=1:1}. The default is false. See also \texttt{vmarginratio}.

\texttt{centering}  
sets auto-centering and is equivalent to \texttt{marginratio=1:1}. See also \texttt{marginratio}. The default is false. See also \texttt{marginratio}.

\texttt{twoside}  
switches on twoside mode with left and right margins swapped on verso pages. The option sets \texttt{\IfTwocolumn} and \texttt{\ifmparswitch} switches. See also \texttt{asymmetric}.

\texttt{asymmetric}  
implements a twosided layout in which margins are not swapped on alternate pages (by setting \texttt{\oddsidemargin} to \texttt{\evensidemargin + bindingoffset}) and in which the marginal notes stay always on the same side. This option can be used as an alternative to the twoside option. See also \texttt{twoside}.

\texttt{bindingoffset}  
removes a specified space from the lefthand-side of the page for oneside or the inner-side for twoside. \texttt{bindingoffset=\{length\}}. This is useful if pages are bound by a press binding (glued, stitched, stapled . . . ). See Figure 6.

hdivide See description in Section 5.3.

vdivide See description in Section 5.3.

divide See description in Section 5.3.

5.5 Native dimensions

The options below overwrite \LaTeX{} native dimensions and switches for page layout (See the right-hand side in Figure 1).
Figure 6: The option bindingoffset adds the specified length to the inner margin. Note that twoside option swaps the horizontal margins and the marginal notes together with bindingoffset on even pages (see b), but asymmetric option suppresses the swap of the margins and marginal notes (but bindingoffset is still swapped).

headheight or head modifies \headheight, height of header. headheight=⟨length⟩ or head=⟨length⟩.

headsep modifies \headsep, separation between header and text (body). headsep=⟨length⟩.

footskip or foot modifies \footskip, distance separation between baseline of last line of text and baseline of footer. footskip=⟨length⟩ or foot=⟨length⟩.

nohead eliminates spaces for the head of the page, which is equivalent to both \headheight=0pt and \headsep=0pt.

nofoot eliminates spaces for the foot of the page, which is equivalent to \footskip=0pt.

noheadfoot equivalent to nohead and nofoot, which means that \headheight, \headsep and \footskip are all set to 0pt.

footnotesep changes the dimension \skip\footins, separation between the bottom of text body and the top of footnote text.

marginparwidth or marginpar modifies \marginparwidth, width of the marginal notes. marginparwidth=⟨length⟩.

marginparsep modifies \marginparsep, separation between body and marginal notes. marginparsep=⟨length⟩.

nomarginpar shrinks spaces for marginal notes to 0pt, which is equivalent to \marginparwidth=0pt and \marginparsep=0pt.

columnsep modifies \columnsep, the separation between two columns in twocolumn mode.

offset modifies \offset. offset=⟨length⟩.

hoffset modifies \hoffset. hoffset=⟨length⟩.

voffset modifies \voffset. voffset=⟨length⟩.

reversemp makes the marginal notes appear in the left (inner) margin with \reversemarginpartrue. The option doesn’t change includemp mode. It’s set false by default.
5.6 Drivers

The package supports drivers dvips, dvipdfm, pdftex, xetex and vtex. You can also set dvipdfm for dvipdfmx and xdvipdfmx. pdftex for pdflatex, and vtex for V\TeX{} environment. The driver options are exclusive. The driver can be set by either driver=(driver name) or any of the drivers directly like pdftex. By default, geometry guesses the driver appropriate to the system in use. Therefore, you don’t have to set a driver in most cases. However, if you want to use dvipdfm, you should specify it explicitly.

†driver specifies the driver with driver=(driver name). dvips, dvipdfm, pdftex, vtex, xetex, auto and none are available as a driver name. The names except for auto and none can be specified directly with the name without driver=. driver=auto makes the auto-detection work whatever the previous setting is. driver=none disables the auto-detection and sets no driver, which may be useful when you want to let other package work out the driver setting. For example, if you want to use crop package with geometry, you should call \usepackage[driver=none]{geometry} before the crop package.

†dvips writes the paper size in dvi output with the \special{} macro. If you use dvips as a DVI-to-PS driver, for example, to print a document with \geometry{a3paper,landscape} on A3 paper in landscape orientation, you don’t need options “-t a3 -t landscape” to dvips.

†dvipdfm works like dvips except for landscape correction. You can set this option when using dvipdfmx and xdvipdfmx to process the dvi output.

†pdftex sets \pdfpagewidth and \pdfpageheight internally.

†xetex is the same as pdftex except for ignoring \pdf{h,v}origin undefined in X\TeX{}. This option is introduced in the version 5. Note that ‘geometry.cfg’ in T\EX{} Live, which disables the auto-detection routine and sets pdftex, is no longer necessary, but has no problem even though it’s left undeleted. Instead of xetex, you can specify dvipdfm with X\TeX{} supports.

†vtex sets dimensions \mediawidth and \mediaheight for V\TeX{}. When this driver is selected (explicitly or automatically), geometry will auto-detect which output mode (DVI, PDF or PS) is selected in V\TeX{}, and do proper settings for it.

If explicit driver setting is mismatched with the typesetting program in use, the default driver dvips would be selected.

5.7 Other options

The other useful options are described here.

†verbose displays the parameter results on the terminal. verbose=false (default) still puts them into the log file.

†reset sets back the layout dimensions and switches to the settings before geometry is loaded. Options given in geometry.cfg are also cleared. Note that this cannot reset pass and mag with truedimen. reset=false has no effect and cannot cancel the previous reset=true if any. For example, when you go

\documentclass[landscape]{article}
\usepackage[twoside,reset,left=2cm]{geometry}

with \ExecuteOptions{scale=0.9} in geometry.cfg, then as a result, landscape and left=2cm remain effective, and scale=0.9 and twoside are ineffective.

†mag sets magnification value (\mag) and automatically modifies \hoffset and \voffset according to the magnification. \mag=value. Note that \value{} should be an integer value with 1000 as a normal size. For example, mag=1414 with a4paper provides an enlarged print fitting in a3paper, which is 1.414 (=\sqrt{2}) times larger than a4paper. Font enlargement needs extra disk space. Note that setting mag should precede any other settings with ‘true’ dimensions, such as 1.5truein, 2truecm and so on. See also truedimen option.
† truedimen changes all internal explicit dimension values into true dimensions, e.g., 1in is changed to 1truein. Typically this option will be used together with mag option. Note that this is ineffective against externally specified dimensions. For example, when you set “mag=1440, margin=10pt, truedimen”, margins are not ‘true’ but magnified. If you want to set exact margins, you should set like “mag=1440, margin=10truept, truedimen” instead.

† pass disables all of the geometry options and calculations except verbose and showframe. It is order-independent and can be used for checking out the page layout of the documentclass, other packages and manual settings without geometry.

† showframe shows visible frames for the text area and page, and the lines for the head and foot on the first page.

† showcrop prints crop marks at each corner of user-specified layout area.

6 Processing options

6.1 Order of loading

If there’s geometry.cfg somewhere \TeX can find it, geometry loads it first. For example, in geometry.cfg you may write \ExecuteOptions{a4paper}, which specifies A4 paper as the default paper. Basically you can use all the options defined in geometry with \ExecuteOptions{}.

The order of loading in the preamble of your document is as follows:

1. geometry.cfg if it exists.
2. Options specified with \documentclass{⟨options⟩}{...}.
3. Options specified with \usepackage{⟨options⟩}{geometry}
4. Options specified with \geometry{⟨options⟩}, which can be called multiple times. (reset option will cancel the specified options ever given in \usepackage{geometry} or \geometry.)

6.2 Order of options

The specification of geometry options is order-independent, and overwrites the previous one for the same setting. For example,

\[\text{[left=2cm, right=3cm]} \text{is equivalent to [right=3cm, left=2cm].}\]

The options called multiple times overwrite the previous settings. For example,

\[\text{[verbose=true, verbose=false] results in verbose=false.}\]

\[\text{[hmargin={3cm,2cm}, left=1cm]} \text{is the same as hmargin={1cm,2cm}, where the left (or inner) margin is overwritten by left=1cm.}\]

reset and mag are exceptions. The reset option removes all the geometry options (except pass) before it. If you set

\[
\begin{align*}
\text{\documentclass[landscape]{article}} \\
\text{\usepackage[margin=1cm,twoside]{geometry}} \\
\text{\geometry{a5paper, reset, left=2cm}}
\end{align*}
\]

then margin=1cm, twoside and a5paper are removed, and is eventually equivalent to

\[
\begin{align*}
\text{\documentclass[landscape]{article}} \\
\text{\usepackage[left=2cm]{geometry}}
\end{align*}
\]

The mag option should be set in advance of any other settings with ‘true’ length, such as left=1.5truecm, width=5truein and so on. The \mag primitive can be set before this package is called.
6.3 Priority

There are several ways to set dimensions of the body: scale, total, text and lines. The geometry package gives higher priority to the more concrete specification. Here is the priority rule for body.

\[
\text{priority: low} \rightarrow \text{high}
\[
\begin{align*}
\{ \text{hscale} \} & \prec \{ \text{width} \} < \{ \text{textwidth} \} < \{ \text{lines} \} \\
\{ \text{vscale} \} & \prec \{ \text{height} \} < \{ \text{textheight} \} < \{ \text{lines} \} \\
\{ \text{scale} \} & \prec \{ \text{total} \} < \{ \text{text} \} < \{ \text{lines} \}
\end{align*}
\]

For example,

\begin{verbatim}
\usepackage[hscale=0.8, textwidth=7in, width=18cm]{geometry}
\end{verbatim}

is the same as \usepackage[textwidth=7in]{geometry}. Another example:

\begin{verbatim}
\usepackage[lines=30, scale=0.8, text=7in]{geometry}
\end{verbatim}

results in \[\text{lines}=30, \text{textwidth}=7\text{in}\].

6.4 Defaults

This section sums up the default settings for the auto-completion described later.

The default vertical margin ratio is \(2/3\), namely,

\[
\text{top : bottom} = 2 : 3 \quad \text{default.} \quad (6)
\]

As for the horizontal margin ratio, the default value depends on whether the document is onesided or twosided,

\[
\text{left (inner)} : \text{right (outer)} = \begin{cases} 
1 : 1 & \text{default for oneside,} \\
2 : 3 & \text{default for twoside.}
\end{cases} \quad (7)
\]

Obviously the default horizontal margin ratio for oneside is ‘centering’.

The \texttt{geometry} package has the following default setting for \texttt{onesided} documents:

\begin{itemize}
\item \texttt{scale}=0.7 (\texttt{body} is \(0.7 \times \texttt{paper}\))
\item \texttt{marginratio}={1:1, 2:3} (1:1 for horizontal and 2:3 for vertical margins)
\item \texttt{ignoreall} (the header, footer, marginal notes are excluded when calculating the size of \texttt{body}.)
\end{itemize}

For \texttt{twosided} document with \texttt{twoside} option, the default setting is the same as \texttt{onesided} except that the horizontal margin ratio is set to \(2:3\) as well.

Additional options overwrite the previous specified dimensions.

6.5 Auto-completion

Figure 7 shows schematically how many specification patterns exist and how to solve the ambiguity of the specifications. Each axis shows the numbers of lengths explicitly specified for body and margins. \(S(m,b)\) presents the specification with a set of numbers (\texttt{margin, body}) = \((m, b)\).

For example, the specification \texttt{width}=14cm, \texttt{left}=3cm is categorized into \(S(1,1)\), which is an adequate specification. If you add \texttt{right}=4cm, it would be in \(S(2,1)\) and overspecified. If only \texttt{width}=14cm is given, it’s in \(S(0,1)\), underspecified.

The \texttt{geometry} package has the auto-completion mechanism, in which if the layout parameters are underspecified or overspecified, \texttt{geometry} works out the ambiguity using the defaults and other relations. Here are the specifications and the completion rules.

\begin{itemize}
\item \texttt{S(0,0)} Nothing is specified. The \texttt{geometry} package sets \texttt{body} with the default \texttt{scale} (= 0.7).
\item For example, \texttt{width} is set to be \(0.7 \times \texttt{layoutwidth}\). Note that by default \texttt{layoutwidth} and \texttt{layoutheight} will be equal to \texttt{paperwidth} and \texttt{paperheight} respectively. Thus \texttt{S(0,0)} goes to \texttt{S(0,1)}. See \texttt{S(0,1)}.\end{itemize}
Figure 7: Specifications $S(0,0)$ to $S(2,1)$ and the completion rules (arrows). Column and row numbers denote the number of explicitly specified lengths for margin and body respectively. $S(m,b)$ denote a specification with a set of the numbers $(margin, body) = (m, b)$.

$S(0,1)$ Only body is specified, such as width=7in, lines=20, body={20cm,24cm}, scale=0.9 and so forth. Then geometry sets margins with the margin ratio. If the margin ratio is not specified, the default is used. The default vertical margin ratio is defined as

$$top : bottom = 2 : 3 \quad default. \quad (8)$$

As for the horizontal margin ratio, the default value depends on whether the document is onesided or twosided,

$$left (inner) : right (outer) = \begin{cases} 1 : 1 & \text{default for oneside,} \\ 2 : 3 & \text{default for twoside.} \end{cases} \quad (9)$$

For example, if height=22cm is specified on A4 paper, geometry calculates top margin as follows:

$$top = (layoutheight - height) \times 2/5$$
$$= (29.7 - 22) \times 2/5 = 3.08\text{cm} \quad (10)$$

Thus top margin and body height have been determined, the specification for the vertical goes to $S(1,1)$ and all the parameters can be solved.

$S(1,0)$ Only one margin is specified, such as bottom=2cm, left=1in, top=3cm, and so forth.

- **If the margin ratio is not specified**, geometry sets body with the default scale (= 0.7). For example, if top=2.4cm is specified, geometry sets

$$height = 0.7 \times layoutheight \quad (= 0.7 \text{\ paperheight by default})$$

then $S(1,0)$ goes to $S(1,1)$, in which bottom is calculated with layoutheight − (height + top) and results in 6.51cm on A4 paper if the layout size is equal to the paper size.

- **If the margin ratio is specified**, such as hmarginratio={1:2}, vratio={3:4} and so forth, geometry sets the other margin with the specified margin ratio. For example, if a set of options “top=2.4cm, vratio={3:4}” is specified, geometry sets bottom to be 3.2cm calculating

$$bottom = top/3 \times 4 = 3.2\text{cm}$$

Thus $S(1,0)$ goes to $S(2,0)$.

Note that the version 4 or earlier used to set the other margin with the margin ratio. In the version 5, therefore, with the same specification, the result will be different from the one in the version 4. For example, if only top=2.4cm is specified, you got bottom=2.4cm in the version 4 or earlier, but you will get bottom=6.51cm in the version 5.
The body and two margins are all specified, such as \vdivide={1in,8in,1.5in}, “left=3cm,width=13cm,right=4cm” and so forth. Since geometry basically gives priority to margins if dimensions are overspecified, geometry forgets and resets body. For example, if you specify

\usepackage[a4paper,left=3cm,width=13cm,right=4cm]{geometry},

width is reset to be 14cm because the width of a A4 paper is 21cm long.

7 Changing layout mid-document

The version 5 provides the new commands \newgeometry{···} and \restoregeometry, which allow you to change page dimensions in the middle of the document. Unlike \geometry in the preamble, \newgeometry is available only after \begin{document}, resets all the options ever specified except for the papersize-related options: landscape, portrait, and paper size options (such as papersize, paper=a4paper and so forth), which can’t be changed with \newgeometry.

The command \restoregeometry restores the page layout specified in the preamble (before \begin{document}) with the options to \usepackage{geometry} and \geometry.

Note that both \newgeometry and \restoregeometry insert \clearpage where they are called.

Below is an example of changing layout mid-document. The layout L1 specified with hmargin=3cm (left and right margins are 3cm long) is changed to L2 with left=3cm, right=1cm and bottom=0.1cm. The layout L1 is restored with \restoregeometry.

\usepackage[hmargin=3cm]{geometry}
\begin{document}
Layout L1
\newgeometry{left=3cm,right=1cm,bottom=0.1cm}
Layout L2 (new)
\restoregeometry
Layout L1 (restored)
\newgeometry{margin=1cm,includefoot}
Layout L3 (new)
\end{document}

A set of commands \savegeometry{⟨name⟩} and \loadgeometry{⟨name⟩} is handy if you want to reuse more different layouts in your document. For example,

\usepackage[hmargin=3cm]{geometry}
\begin{document}
L1
\newgeometry{left=3cm,right=1cm,bottom=0.1cm}
\savegeometry{L2}
L2 (new, saved)
8 Examples

1. A onesided page layout with the text area centered in the paper. The examples below have the same result because the horizontal margin ratio is set 1:1 for oneside by default.
   - centering
   - marginratio=1:1
   - vcentering

2. A twosided page layout with the inside offset for binding set to 1cm.
   - twoside, bindingoffset=1cm

   In this case, textwidth is shorter than that of the default twosided document by $0.7 \times 1cm (= 0.7cm)$ because the default width of body is set with scale=0.7, which means $\text{width} = 0.7 \times \text{layoutwidth} (= 0.7 \times \text{paperwidth}$ by default).

3. A layout with the left, right, and top margin 3cm, 2cm and 2.5in respectively, with textheight of 40 lines, and with the head and foot of the page included in total body. The two examples below have the same result.
   - left=3cm, right=2cm, lines=40, top=2.5in, includeheadfoot
   - hmargin={3cm,2cm}, tmargin=2.5in, lines=40, includeheadfoot

4. A layout with the height of total body 10in, the bottom margin 2cm, and the default width. The top margin will be calculated automatically. Each solution below results in the same page layout.
   - vdivide={*, 10in, 2cm}
   - bmargin=2cm, height=10in
   - bottom=2cm, textheight=10in

   Note that dimensions for head and foot are excluded from height of total body. An additional includefoot makes \footskip included in totalheight. Therefore, in the two cases below, textheight in the former layout is shorter than the latter (with 10in exactly) by \footskip. In other words, $\text{height} = \text{textheight} + \text{footskip}$ when includefoot=true in this case.
   - bmargin=2cm, height=10in, includefoot
   - bottom=2cm, textheight=10in, includefoot

5. A layout with textwidth and textheight 90% of the paper and with body centered. Each solution below results in the same page layout as long as layoutwidth and layoutheight are not modified from the default.
   - scale=0.9, centering
   - text={.9\paperwidth,.9\paperheight}, ratio=1:1
   - width=.9\paperwidth, vmargin=.05\paperheight, marginratio=1:1
   - hdivide={*,0.9\paperwidth,*}, vdivide={*,0.9\paperheight,*} (as for onesided documents)
   - margin={0.05\paperwidth,0.05\paperheight}

   You can add heightrounded to avoid an “underfull vbox warning” like

   \texttt{Underfull \vbox (badness 10000) has occurred while \output is active.}
See Section 5.3 for the detailed description about `heightrounded`.

6. A layout with the width of marginal notes set to 3cm and included in the width of total body. The following examples are the same.

   - `\marginparwidth=3cm, includemp`
   - `\marginpar=3cm, ignoremp=false`

7. A layout where body occupies the whole paper with A5 paper in landscape. The following examples are the same.

   - `\a5paper, landscape, scale=1.0`
   - `landscape=TRUE, paper=a5paper, margin=0pt`

8. A screen size layout appropriate for presentation with PC and video projector.

   ```latex
   \documentclass{slide}
   \usepackage[screen,margin=0.8in]{geometry}
   ...
   \begin{slide}
   ...
   \end{slide}
   ```

9. A layout with fonts and spaces both enlarged from A4 to A3. In the case below, the resulting paper size is A3.

   - `\a4paper, mag=1414`

   If you want to have a layout with two times bigger fonts, but without changing paper size, you can type

   - `\letterpaper, mag=2000, truedimen`

   You can add `dvips` option, that is useful to preview it with proper paper size by `dviout` or `xdvi`.

10. Changing the layout of the first page and leaving the others as default before loading `geometry`. Use `pass` option, `\newgeometry` and `\restoregeometry`.

    ```latex
    \documentclass{book}
    \usepackage[pass]{geometry}
    % 'pass' disregards the package layout,
    % so the original 'book' layout is memorized here.
    \begin{document}
    \newgeometry{margin=1cm}% changes the first page dimensions.
    Page 1
    \restoregeometry % restores the original 'book' layout.
    Page 2 and more
    \end{document}
    ```

11. A complex page layout.

    ```latex
    \usepackage[a5paper, landscape, twocolumn, twoside, 
    left=2cm, hmarginratio=2:1, includemp, marginparwidth=43pt, 
    bottom=1cm, foot=.7cm, includefoot, textheight=11cm, heightrounded, 
    columns=1cm, dvips, verbose]{geometry}
    ```

    Try typesetting it and checking out the result yourself. :-)  

## 9 Known problems

- With `mag \neq 1000` and `truedimen`, `paperwidth` and `paperheight` shown in verbose mode are different from the real size of the resulted PDF. The PDF itself is correct anyway.

- With `mag \neq 1000`, no `truedimen` and `hyperref`, `hyperref` should be loaded before `geometry`. Otherwise the resulted PDF size will become wrong.

- With `crop` package and `mag \neq 1000`, `center` option of `crop` doesn’t work well.
10 Acknowledgments


hmargin=4.2cm,1.5cm,vmargin=1cm,1cm, includeheadfoot, marginpar=3.8cm

11 Implementation

This package requires the following packages: keyval, ifpdf, ifvtex and ifxetex.

\RequirePackage{keyval} \RequirePackage{ifpdf} \RequirePackage{ifvtex} \RequirePackage{ifxetex}

Internal switches are declared here.

\newif\ifGm@verbose \newif\ifGm@landscape \newif\ifGm@swap@papersize \newif\ifGm@includehead \newif\ifGm@includefoot \newif\ifGm@includemp \newif\ifGm@hboby \newif\ifGm@vbody \newif\ifGm@heightrounded \newif\ifGm@showframe \newif\ifGm@pass \newif\ifGm@resetpaper \newif\ifGm@layout \newif\ifGm@newgm

\newcount\Gm@cnth \newcount\Gm@cntv \newcount\c@Gm@tempcnt \newdimen\Gm@bindingoffset \newdimen\Gm@wd@mp \newdimen\Gm@odd@mp \newdimen\Gm@even@mp \newdimen\Gm@layouthoffset \newdimen\Gm@layoutvoffset \newtoks\Gm@dimlist \def\Gm@warning#1{\PackageWarningNoLine{geometry}{#1}}

The counters for horizontal and vertical partitioning patterns.

The counter is used to set number with calc.

The binding offset for the inner margin.

Correction lengths for \textwidth, \oddsidemargin and \evensidemargin in includemp mode.

The dimensions for the layout area.

The token in which \LaTeX native dimensions can be stored.

The macro to print warning messages.
The macro executes the option given as an argument only if it’s specified in the preamble, as the options of `\usepackage` and/or the argument of `\geometry`. Otherwise, the macro would print the warning message and ignores the option setting.

```latex
\def\ifGm@preamble#1{\
\ifGm@newgm\Gm@warning{\string'#1': not available in '\string\newgeometry'; skipped}\
\else
\expandafter\@firstofone
\fi}
```

The default values for the horizontal and vertical `marginalratio` are defined. `\Gm@Dhratio` denotes the default value of horizontal `marginalratio` for twoside page layout with left and right margins swapped on verso pages, which is set by `twoside`.

```latex
\def\Gm@Dhratio{1:1} % = left:right default for oneside
\def\Gm@Dhratiotwo{2:3} % = inner:outer default for twoside.
\def\Gm@Dvratio{2:3} % = top:bottom default
```

The default values for the horizontal and vertical `scale` are defined with 0.7.

```latex
\def\Gm@Dhscale{0.7}
\def\Gm@Dvscale{0.7}
```

The driver names.

```latex
\def\Gm@dvips{dvips}
\def\Gm@dvipdfm{dvipdfm}
\def\Gm@pdftex{pdftex}
\def\Gm@xetex{xetex}
\def\Gm@vtex{vtex}
```

The macros for `true` and `false`.

```latex
\def\Gm@true{true}
\def\Gm@false{false}
```

These macros keep original paper (media) size intact.

```latex
\edef\Gm@orgpw{\the\paperwidth}
\edef\Gm@orgph{\the\paperheight}
```

The macro saves the specified length to `\Gm@restore`.

```latex
\def\Gm@savelength#1{\g@addto@macro{\Gm@restore}{\expandafter\noexpand\csname #1\endcsname=\expandafter\the\csname #1\endcsname}}
```

The macro saves the specified boolean to `\Gm@restore`.

```latex
\def\Gm@saveboolean#1{\csname if#1\endcsname\g@addto@macro{\Gm@restore}{\expandafter\noexpand\csname #1true\endcsname}\
\else\g@addto@macro{\Gm@restore}{\expandafter\noexpand\csname #1false\endcsname}\fi}
```

The initialization for `\Gm@restore`.

```latex
\def\Gm@restore{}
```

The definition of the macro saving the real lengths of `\LaTeX` options.

```latex
\def\Gm@save{\Gm@savelength{paperwidth}\
\Gm@savelength{paperheight}\
\Gm@savelength{textwidth}\
\Gm@savelength{textheight}\
\Gm@savelength{evensidemargin}\
\Gm@savelength{oddsidemargin}\
\Gm@savelength{topmargin}\
\Gm@savelength{headheight}\
\Gm@savelength{headsep}}
```
The macro initializes the parameters for layout in \newgeometry.

\def\Gm@initnewgm{%
  \Gm@passfalse
  \Gm@swap@papersizefalse
  \Gm@dimlist={}
  \Gm@hbodyfalse
  \Gm@vbodyfalse
  \Gm@heightroundedfalse
  \Gm@includeheadfalse
  \Gm@includefootfalse
  \Gm@includempfalse
  \let\Gm@width\@undefined
  \let\Gm@height\@undefined
  \let\Gm@textwidth\@undefined
  \let\Gm@textheight\@undefined
  \let\Gm@lines\@undefined
  \let\Gm@hscale\@undefined
  \let\Gm@vscale\@undefined
  \let\Gm@hmarginratio\@undefined
  \let\Gm@vmarginratio\@undefined
  \let\Gm@lmargin\@undefined
  \let\Gm@rmargin\@undefined
  \let\Gm@tmargin\@undefined
  \let\Gm@bmargin\@undefined
  \Gm@layoutfalse
  \Gm@layouthoffset\z@
  \Gm@layoutvoffset\z@
}\

\def\Gm@initall{%
  \let\Gm@driver\@empty
  \let\Gm@truedimen\@empty
  \let\Gm@paper\@undefined
  \Gm@resetpaperfalse
  \Gm@landscapefalse
  \Gm@verbosefalse
  \Gm@showframefalse
  \Gm@showcropfalse
  \Gm@newgmfalse
  \Gm@initnewgm
}\

\def\Gm@setdriver#1{%
  \expandafter\let\expandafter\Gm@driver\csname Gm@#1\endcsname
}\

\def\Gm@unsetdriver#1{%
  \let\Gm@driver\@empty
}\

\def\Gm@setdriver{}\Gm@initnewgm

\def\Gm@setdriver{}\Gm@initall

\def\Gm@setdriver{}\Gm@setdriver#1

\expandafter\let\expandafter\Gm@driver\csname Gm@\endcsname
The macros for boolean option processing.

\def\Gm@unsetdriver#1\%
\expandafter\ifx\csname Gm@#1\endcsname\Gm@driver\let\Gm@driver\@empty\fi
\def\Gm@setbool\[\]
\def\Gm@setboolrev\[\]
\def\Gm@@setbool[#1]#2#3{\Gm@doif{#1}{#3}{\csname Gm@#2\Gm@bool\endcsname}}
\def\Gm@@setboolrev[#1]#2#3{\Gm@doifelse{#1}{#3}{\csname Gm@#2\Gm@false\endcsname}{\csname Gm@#2\Gm@true\endcsname}}
\Gm@doif\[\]
\Gm@doifelse\[\]
\Gm@reverse\[\]
\Gm@defbylen\[\]
\Gm@defbycnt\[\]
\Gm@set@ratio\[\]
\Gm@setbyratio\[\]
\Gm@set@ratio
The macro parses the value of options specifying marginal ratios, which is used in \Gm@setbyratio macro.
\Gm@setbyratio
The macro determines the dimension specified by \#4 calculating \(3 \times a/b\), where \(a\) and \(b\) are given by \Gm@mratio with a \(b\) value. If \#1 in brackets is \(b\), \(a\) and \(b\) are swapped. The second argument with \(h\) or \(v\) denoting horizontal or vertical is not used in this macro.
This macro determines the fourth length (#4) from #1 (layoutwidth or layoutheight), #2 and #3. It is used in \Gm@detall macro.

\def\Gm@detiv#1#2#3#4{% determine #4.
 \expandafter\setlength\expandafter\@tempdima\expandafter{\csname Gm@layout#1\endcsname}%
 \expandafter\setlength\expandafter\@tempdimb\expandafter{\csname Gm@#2\endcsname}%
 \addtolength\@tempdima{-\@tempdimb}%
 \expandafter\setlength\expandafter\@tempdimb\expandafter{\csname Gm@#3\endcsname}%
 \addtolength\@tempdima{-\@tempdimb}%
 \ifdim\@tempdima<\z@ \Gm@warning{'#4' results in NEGATIVE (\the\@tempdima).% ^J\@spaces '#2' or '#3' should be shortened in length}%
 \fi
 \expandafter\edef\csname Gm@#4\endcsname{\the\@tempdima}}%

This macro determines #2 and #3 from #1 with the first argument (#1) can be width or height, which is expanded into dimensions of paper and total body. It is used in \Gm@detall macro.

\def\Gm@detiiandiii#1#2#3{% determine #2 and #3.
 \expandafter\setlength\expandafter\@tempdima\expandafter{\csname Gm@layout#1\endcsname}%
 \expandafter\setlength\expandafter\@tempdimb\expandafter{\csname Gm@#1\endcsname}%
 \addtolength\@tempdima{-\@tempdimb}%
 \ifdim\@tempdima<\z@ \Gm@warning{'#2' and '#3' result in NEGATIVE (\the\@tempdima).%^J\@spaces '##1' should be shortened in length}%
 \fi
 \ifx\Gm@mratio\@undefined \expandafter\Gm@sep@ratio\Gm@Dmratio\relax
 \else \expandafter\Gm@sep@ratio\Gm@mratio\relax
 \ifnum\@tempcntb>\z@ \else \Gm@warning{margin ratio a:b should be non-zero; default used}%
 \expandafter\Gm@sep@ratio\Gm@mratio\relax
 \fi
 \fi
 \@tempdimb=\@tempdima
 \advance\@tempcntb\@tempcnta
 \divide\@tempdima@\@tempcntb
 \multiply\@tempdima@\@tempcntb
 \advance\@tempdima\@tempdima@\@tempcntb
 \expandafter\edef\csname Gm@#2\endcsname{\the\@tempdima}%
 \expandafter\edef\csname Gm@#3\endcsname{\the\@tempdima}%

This macro determines partition of each direction. The first argument (#1) should be h or v, the second (#2) width or height, the third (#3) lmargin or top, and the last (#4) rmargin or bottom.

\def\Gm@detall#1#2#3#4{%
 \@tempcnta\z@%
 \if#1h
 \let\Gm@mratio\Gm@hmarginratio
 \edef\Gm@Dmratio{\if@twoside\Gm@Dhratiotwo\else\Gm@Dhratio\fi}%
 \else \let\Gm@mratio\Gm@vmarginratio
 \edef\Gm@Dmratio{\Gm@Dvratio}%
 \fi
 \@tempdima=\@tempdima
 \advance\@tempcntb\@tempcnta
 \divide\@tempdima@\@tempcntb
 \multiply\@tempdima@\@tempcntb
 \advance\@tempdima\@tempdima@\@tempcntb
 \expandafter\edef\csname Gm@#2\endcsname{\the\@tempdima}%
 \expandafter\edef\csname Gm@#3\endcsname{\the\@tempdima}%
 \@tempcnta is treated as a three-digit binary value with top, middle and bottom denoted left(top), width(height) and right(bottom) margins user specified respectively.
Case the value is 000 (=0) with nothing fixed (default):

```
\ifcase\@tempcnta
  \if#1h
    \Gm@defbylen{width}{\Gm@Dhscale\Gm@layoutwidth}\%
  \else
    \Gm@defbylen{height}{\Gm@Dvscale\Gm@layoutheight}\%
  \fi
  \Gm@detiiandiii{#2}{#3}{#4}%
\fi
```

Case 001 (=1) with right (bottom) fixed:

```
\or
\if\Gm@ratio\undefined
  \if#1h
    \Gm@defbylen{width}{\Gm@Dhscale\Gm@layoutwidth}\%
  \else
    \Gm@defbylen{height}{\Gm@Dvscale\Gm@layoutheight}\%
  \fi
  \setlength\@tempdimc{\@nameuse{Gm@#4}}\%
  \Gm@detiiandiii{#2}{#3}{#4}%
\else
  \Gm@setbyratio[fr]{#1}{#3}{#4}%
\fi
\Gm@detiv{#2}{#3}{#4}{#2}%
```
\Gm@clean  The macro for setting unspecified dimensions to be \undefined. This is used by \geometry macro.

\def\Gm@clean{%
  \ifnum\Gm@cnth<4\let\Gm@lmargin\undefined\fi
  \ifodd\Gm@cntv\else\let\Gm@rmargin\undefined\fi
  \ifnum\Gm@cntv<4\let\Gm@tmargin\undefined\fi
  \ifodd\Gm@cntv\else\let\Gm@bmargin\undefined\fi
  \if\Gm@hbody\else
    \let\Gm@hscale\undefined
    \let\Gm@width\undefined
    \let\Gm@textwidth\undefined
  \fi
  \if\Gm@vbody\else
    \let\Gm@vscale\undefined
    \let\Gm@height\undefined
    \let\Gm@textheight\undefined
  \fi
}\

\Gm@parse@divide The macro parses (h,v)divide options.

\def\Gm@parse@divide#1#2#3#4{%\def\Gm@star{*}\
  \@tempcnta\z@
  \@for\Gm@tmp:=#1\do{\expandafter\KV@@sp@def\expandafter\Gm@frag\expandafter{\Gm@tmp}\
    \edef\Gm@value{\Gm@frag}\
    \ifcase\@tempcnta\relax\edef\Gm@key{#2}\
      \or\edef\Gm@key{#3}\
      \else\edef\Gm@key{#4}\fi
    \@nameuse{Gm@set\Gm@key false}\
    \ifx\empty\Gm@value\else
      \ifx\Gm@star\Gm@value\else
        \setkeys{Gm}{\Gm@key=\Gm@value}\
      \fi\fi
    \advance\@tempcnta\@ne}\
  \ifnum\@tempcnta=\@ne
    \setkeys{Gm}{#3=\Gm@value}\
  \fi}\

\Gm@branch The macro splits a value into the same two values.

\def\Gm@branch#1#2#3{%\@tempcnta\z@
  \@for\Gm@tmp:=#1\do{\KV@@sp@def\Gm@frag{\Gm@tmp}\
    \edef\Gm@value{\Gm@frag}\
    \ifcase\@tempcnta\relax\setkeys{Gm}{#2=\Gm@value}\
      \or\setkeys{Gm}{#3=\Gm@value}\
      \else\fi
    \advance\@tempcnta\@ne}\
  \ifnum\@tempcnta=\@ne
    \setkeys{Gm}{#3=\Gm@value}\
  \fi}%

\Gm@magtooffset This macro is used to adjust offsets by \mag.

\def\Gm@magtooffset{%\@tempdima=\mag\Gm@truedimen sp\n  \@tempdimb=1\Gm@truedimen in\n  \divide\@tempdimb@\@tempdima\n  \multiply\@tempdimb@\@m
  \addtolength{\hoffset}{1\Gm@truedimen in}\
  \addtolength{\voffset}{1\Gm@truedimen in}\
}
This macro stores \TeX\ native dimensions, which are stored and set afterwards.

\def\Gm@setlength#1#2{% 
  \let\Gm@len=\relax \let\Gm@td=\relax 
  \edef\addtolist={\noexpand\Gm@dimlist=%
    \Gm@len{#1}{#2}}\addtolist}%

This macro processes \Gm@dimlist.

\def\Gm@expandlengths{% 
  \def\Gm@td{\Gm@truedimen} 
  \def\Gm@len##1##2{\setlength{##1}{##2}}\the\Gm@dimlist}%

The macro sets paperwidth and paperheight dimensions using \Gm@setlength macro.

\def\Gm@setsize#1(#2,#3)#4{% 
  \let\Gm@td\relax 
  \expandafter\Gm@setlength\csname #1width\endcsname{#2\Gm@td #4} 
  \expandafter\Gm@setlength\csname #1height\endcsname{#3\Gm@td #4} 
  \ifGm@landscape\Gm@swap@papersizetrue\else\Gm@swap@papersizefalse\fi}

Various paper size are defined here.

\@namedef{Gm@a0paper}#1{\Gm@setsize{#1}(841,1189){mm}}% ISO A0
\@namedef{Gm@a1paper}#1{\Gm@setsize{#1}(594,841){mm}}% ISO A1
\@namedef{Gm@a2paper}#1{\Gm@setsize{#1}(420,594){mm}}% ISO A2
\@namedef{Gm@a3paper}#1{\Gm@setsize{#1}(297,420){mm}}% ISO A3
\@namedef{Gm@a4paper}#1{\Gm@setsize{#1}(210,297){mm}}% ISO A4
\@namedef{Gm@a5paper}#1{\Gm@setsize{#1}(148,210){mm}}% ISO A5
\@namedef{Gm@a6paper}#1{\Gm@setsize{#1}(105,148){mm}}% ISO A6
\@namedef{Gm@b0paper}#1{\Gm@setsize{#1}(1000,1414){mm}}% ISO B0
\@namedef{Gm@b1paper}#1{\Gm@setsize{#1}(707,1000){mm}}% ISO B1
\@namedef{Gm@b2paper}#1{\Gm@setsize{#1}(500,707){mm}}% ISO B2
\@namedef{Gm@b3paper}#1{\Gm@setsize{#1}(353,500){mm}}% ISO B3
\@namedef{Gm@b4paper}#1{\Gm@setsize{#1}(250,353){mm}}% ISO B4
\@namedef{Gm@b5paper}#1{\Gm@setsize{#1}(176,250){mm}}% ISO B5
\@namedef{Gm@b6paper}#1{\Gm@setsize{#1}(125,176){mm}}% ISO B6
\@namedef{Gm@c0paper}#1{\Gm@setsize{#1}(917,1297){mm}}% ISO C0
\@namedef{Gm@c1paper}#1{\Gm@setsize{#1}(648,917){mm}}% ISO C1
\@namedef{Gm@c2paper}#1{\Gm@setsize{#1}(458,648){mm}}% ISO C2
\@namedef{Gm@c3paper}#1{\Gm@setsize{#1}(324,458){mm}}% ISO C3
\@namedef{Gm@c4paper}#1{\Gm@setsize{#1}(229,324){mm}}% ISO C4
\@namedef{Gm@c5paper}#1{\Gm@setsize{#1}(162,229){mm}}% ISO C5
\@namedef{Gm@c6paper}#1{\Gm@setsize{#1}(114,162){mm}}% ISO C6
\@namedef{Gm@b0j}#1{\Gm@setsize{#1}(1030,1456){mm}}% JIS B0
\@namedef{Gm@b1j}#1{\Gm@setsize{#1}(728,1030){mm}}% JIS B1
\@namedef{Gm@b2j}#1{\Gm@setsize{#1}(515,728){mm}}% JIS B2
\@namedef{Gm@b3j}#1{\Gm@setsize{#1}(364,515){mm}}% JIS B3
\@namedef{Gm@b4j}#1{\Gm@setsize{#1}(257,364){mm}}% JIS B4
\@namedef{Gm@b5j}#1{\Gm@setsize{#1}(182,257){mm}}% JIS B5
\@namedef{Gm@b6j}#1{\Gm@setsize{#1}(128,182){mm}}% JIS B6
\@namedef{Gm@ansiapaper}#1{\Gm@setsize{#1}(8.5,11){in}}% ANSI A
\@namedef{Gm@ansibpaper}#1{\Gm@setsize{#1}(11,17){in}}% ANSI B
\@namedef{Gm@ansicpaper}#1{\Gm@setsize{#1}(17,22){in}}% ANSI C
\@namedef{Gm@ansidpaper}#1{\Gm@setsize{#1}(22,34){in}}% ANSI D
\@namedef{Gm@ansiepaper}#1{\Gm@setsize{#1}(34,44){in}}% ANSI E
\@namedef{Gm@letterpaper}#1{\Gm@setsize{#1}(8.5,11){in}}% Letter
\@namedef{Gm@legalpaper}#1{\Gm@setsize{#1}(8.5,14){in}}% Legal
\@namedef{Gm@executivepaper}#1{\Gm@setsize{#1}(7.25,10.5){in}}% Executive
\@namedef{Gm@screen}#1{\Gm@setsize{#1}(225,190){mm}}% Screen
'paper' takes a paper name as its value.

The following paper names are available.

- 'a0' paper
- 'a1' paper
- 'a2' paper
- 'a3' paper
- 'a4' paper
- 'a5' paper
- 'a6' paper
- 'b0' paper
- 'b1' paper
- 'b2' paper
- 'b3' paper
- 'b4' paper
- 'b5' paper
- 'b6' paper
- 'c0' paper
- 'c1' paper
- 'c2' paper
- 'c3' paper
- 'c4' paper
- 'c5' paper
- 'c6' paper
- 'b0j'
- 'b1j'
- 'b2j'
- 'b3j'
- 'b4j'
- 'b5j'
- 'b6j'
- 'ansiapaper'
- 'ansibpaper'
- 'ansicpaper'
- 'ansidpaper'
- 'ansiepaper'
- 'letterpaper'
- 'legalpaper'
- 'executivepaper'
- 'screen'

Direct specification for paper size is also possible.

- 'paperwidth'
- 'paperheight'
- 'papersize'

Direct specification for layout size is also possible.

- 'layout'
- 'layoutwidth'
- 'layoutheight'
- 'layoutsize'

Paper orientation setting.

- 'landscape'
- 'portrait'
These options can determine the length(s) of \textit{total body} giving \textit{scale(s)} against the paper size.

These options give concrete dimension(s) of \textit{total body}. \textit{totalwidth} and \textit{totalheight} are aliases of \textit{width} and \textit{height} respectively.

These options directly sets the dimensions \textit{\textwidth} and \textit{\textheight}. \textit{\text} is an alias of \textit{\text}.

These options exclude head, foot and marginpars when determining body.

The options take the corresponding dimensions as part of body.

The options are useful to specify partitioning in each direction of the paper.

The options rounds \textit{\textheight} to \textit{n}-times of \textit{\baselineskip} plus \textit{\topskip}.

These options set margins. \textit{left}, inner, innermargin are aliases of \textit{lmargin}. \textit{right}, outer, outermargin are aliases of \textit{rmargin}. top and bottom are aliases of \textit{tmargin} and \textit{bmargin} respectively.
These options are shorthands for setting margins.

\begin{verbatim}
\define@key{Gm}{hmargin}{\Gm@branch{#1}{lmargin}{rmargin}}%
\define@key{Gm}{vmargin}{\Gm@branch{#1}{tmargin}{bmargin}}%
\define@key{Gm}{margin}{\Gm@branch{#1}{lmargin}{tmargin}\Gm@branch{#1}{rmargin}{bmargin}}%
\end{verbatim}

Options specifying the margin ratios.

\begin{verbatim}
\define@key{Gm}{hmarginratio}{\edef\Gm@hmarginratio{#1}}%
\define@key{Gm}{vmarginratio}{\edef\Gm@vmarginratio{#1}}%
\define@key{Gm}{marginratio}{\Gm@branch{#1}{hmarginratio}{vmarginratio}}%
\end{verbatim}

Useful shorthands to place body centered.

\begin{verbatim}
\define@key{Gm}{hcentering}{true}{\Gm@doifelse{hcentering}{#1}{}}%
\define@key{Gm}{vcentering}{true}{\Gm@doifelse{vcentering}{#1}{}}%
\define@key{Gm}{centering}{true}{\Gm@doifelse{centering}{#1}{\def\Gm@hmarginratio{1:1}\def\Gm@vmarginratio{1:1}}}%
\end{verbatim}

If \twoside=true, \@twoside and \@mparswitch is set to true.

\begin{verbatim}
\define@key{Gm}{twoside}{true}{\Gm@doifelse{twoside}{#1}{\@twosidetrue\@mparswitchtrue}}%
\end{verbatim}

A \asymmetric=false has no effect.

\begin{verbatim}
\define@key{Gm}{asymmetric}{false}{\Gm@doifelse{asymmetric}{#1}{}}%
\end{verbatim}

The macro adds the specified space to the inner margin.

\begin{verbatim}
\define@key{Gm}{bindingoffset}{\Gm@setlength\Gm@bindingoffset{#1}}%
\end{verbatim}

The direct settings of head and/or foot dimensions.

\begin{verbatim}
\define@key{Gm}{headheight}{\Gm@setlength\headheight{#1}}%
\define@key{Gm}{headsep}{\Gm@setlength\headsep{#1}}%
\define@key{Gm}{footskip}{\Gm@setlength\footskip{#1}}%
\end{verbatim}

They are only shorthands to set head and/or foot to be 0pt.

\begin{verbatim}
\define@key{Gm}{nohead}{true}{\Gm@doifelse{nohead}{#1}{}}%
\define@key{Gm}{nofoot}{true}{\Gm@doifelse{nofoot}{#1}{}}%
\end{verbatim}

The option directly sets a native dimension \footnotesep.

\begin{verbatim}
\define@key{Gm}{footnotesep}{\Gm@setlength{\skip\footins}{#1}}%
\end{verbatim}
They directly set native dimensions `\marginparwidth` and `\marginparsep`.

The macro is a shorthand for `\marginparwidth=0pt` and `\marginparsep=0pt`.

The option sets a native dimension `\columnsep`.

The former two options set native dimensions `\hoffset` and `\voffset`. `offset` can set both of them with the same value.

The `\twocolumn` switch.

This option has the reverse effect of `\twocolumn` option.

The both options set `\reversemarginpar`.

The geometry package supports `dvips`, `dvipdfm`, `pdflatex` and `vtex`. `dvipdfm` works like `dvips`.

The verbose mode.

The option cancels all the options specified before `\reset`, except `\pass` `\mag` (≠ 1000) with `\truedimen` cannot be also reset.
If `resetpaper` is set to `true`, the paper size redefined in the package is discarded and the original one is restored. This option may be useful to print nonstandard sized documents with normal printers and papers.

\define@key{Gm}{resetpaper}{[true]}{\ifGm@preamble{resetpaper}{\Gm@setbool{resetpaper}{#1}}}%

`mag` is expanded immediately when it is specified. So `reset` can't reset `mag` when it is set with `truedimen`.

\define@key{Gm}{mag}{[true]}{\ifGm@preamble{mag}{\mag=#1}}%

If `truedimen` is set to `true`, all of the internal explicit dimensions is changed to `true` dimensions, e.g., \texttt{1in} is changed to \texttt{1truein}.

\define@key{Gm}{truedimen}{[true]}{\ifGm@preamble{truedimen}{\Gm@doifelse{truedimen}{#1}{\let\Gm@truedimen\Gm@true}{\let\Gm@truedimen\@empty}}}%

The option makes all the options specified ineffective except verbose switch.

\define@key{Gm}{pass}{[true]}{\ifGm@preamble{pass}{\Gm@setbool{pass}{#1}}}%

The showframe option prints page frames to help you understand what the resulting layout is like.

\define@key{Gm}{showframe}{[true]}{\Gm@setbool{showframe}{#1}}%

The showcrop option prints crop marks at each corner of the layout area.

\define@key{Gm}{showcrop}{[true]}{\Gm@setbool{showcrop}{#1}}%

The macro stores paper dimensions. This macro should be called after \texttt{\ProcessOptionsKV[c]{Gm}}. If the \texttt{landscape} option in \texttt{\documentclass} is specified, the class immediately swaps the paper dimensions.

\def\Gm@setdefaultpaper{%\ifez\Gm@paper@undefined\Gm@setsize{paper}(.strip@pt\paperwidth,.strip@pt\paperheight){pt}\Gm@setsize{Gm@layout}(.strip@pt\paperwidth,.strip@pt\paperheight){pt}\Gm@swappapersizefalse\fi}%

The macro checks if \texttt{width/height} is larger than \texttt{0pt}, which is used in \texttt{\Gm@process}. The paper dimensions can be swapped when paper orientation is changed over by \texttt{landscape} and \texttt{portrait} options.

\def\Gm@adjustpaper{%\ifdim\paperwidth>p@\else\PackageError{geometry}{string\paperwidth\space(\the\paperwidth) too short}{%\Set a paper type (e.g., \texttt{a4paper}).}%\fi\ifdim\paperheight>p@\else\PackageError{geometry}{string\paperheight\space(\the\paperheight) too short}{%\Set a paper type (e.g., \texttt{a4paper}).}%\fi\ifGm@swappapersize\setlength\@tempdima{\paperwidth}\setlength\paperwidth{\paperheight}\setlength\paperheight{\@tempdima}\fi\ifGm@layout\else\setlength\Gm@layoutwidth{\paperwidth}\setlength\Gm@layoutheight{\paperheight}\fi\Gm@checkmp%}

The macro checks whether or not the marginpars overrun the page.

\def\Gm@checkmp{%\ifGm@includemp\else\@tempcnta\z@\@tempcntb\@ne\if@twocolumn\@tempcnta\@ne\else\fi\strictonly%\PackageWarning{geometry}{\string\setlength\string\paper\space(\the\paper) too short}{%\Set a paper type (e.g., \texttt{a4paper}).}%\fi\if\Gm@layout\else\setlength\Gm@layoutwidth{\paperwidth}\setlength\Gm@layoutheight{\paperheight}\fi\Gm@checkmp%}

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The macro sets marginpar correction when \texttt{includemp} is set, which is used in \texttt{Gm@process}. The variables \texttt{Gm@wd@mp}, \texttt{Gm@odd@mp} and \texttt{Gm@even@mp} are set here. Note that \texttt{Gm@even@mp} should be used only for twoside layout.

\begin{verbatim}
\def\Gm@adjustmp{
  \ifGm@include\texttt{mp}
  \@tempdimb\marginparwidth
  \advance\@tempdimb\marginparsep
  \Gm@wd@mp\@tempdimb
  \Gm@odd@mp\z@ \Gm@even@mp\z@
  \if@twocolumn
    \Gm@wd@mp2\@tempdimb
    \Gm@odd@mp\@tempdimb
    \Gm@even@mp\@tempdimb
  \else
    \if\reversemargin
      \Gm@odd@mp\@tempdimb
      \if\mprarswitch\else \Gm@even@mp\@tempdimb \fi
    \else
      \if\mprarswitch
        \Gm@even@mp\@tempdimb
      \fi
    \fi
  \fi
\fi}
\end{verbatim}

\def\Gm@adjustbody{
  \if\Gm@body
    \if\Gm@width\undefined
      \if\Gm@hscale\undefined
        \Gm@defbylen{width}{\Gm@Dhscale\Gm@layoutwidth}\
      \else
        \Gm@defbylen{width}{\Gm@hscale\Gm@layoutwidth}\
      \fi
    \else
      \Gm@defbylen{width}{\Gm@hscale\Gm@layoutwidth}\
    \fi
  \fi
  \if\Gm@textwidth\undefined
  \else
  \fi
\end{verbatim}

\texttt{Gm@adjustmp} If the horizontal dimension of \texttt{body} is specified by user, \texttt{Gm@width} is set properly here.
If the vertical dimension of \textit{body} is specified by user, \texttt{\Gm@height} is set properly here.

\texttt{\if\Gm@body}
\texttt{\ifdef\Gm@height\undefined}
\texttt{\ifdef\Gm@vscale\undefined}
\texttt{\Gm@defbylen{height}{\Gm@Dvscale\Gm@layoutheight}}
\else
\texttt{\Gm@defbylen{height}{\Gm@vscale\Gm@layoutheight}}
\fi
\fi
\ifdef\Gm@lines\undefined
\else
\texttt{\topskip} has to be adjusted so that the formula \textquotedblleft \texttt{\textheight} = (\textit{lines} − 1) \times \texttt{\baselineskip} + \texttt{\topskip}\textquotedblright to be correct even if large font sizes are specified by users. If \texttt{\topskip} is smaller than \texttt{\ht\strutbox}, then \texttt{\topskip} is set to \texttt{\ht\strutbox}.

\texttt{\ifdim\topskip<\ht\strutbox}
\texttt{\setlength\@tempdima{\topskip}}
\texttt{\setlength\topskip{\ht\strutbox}}
\Gm@warning{\noexpand\topskip was changed from \the\@tempdima to \the\topskip}
\fi
\setlength\@tempdima{\baselineskip}
\multiply\@tempdima{\Gm@lines}
\addtolength\@tempdima{\topskip}
\addtolength\@tempdima{−\baselineskip}
\edef\Gm@textheight{\the\@tempdima}
\fi
\ifdef\Gm@textheight\undefined
\else
\setlength\@tempdima{\Gm@textheight}
\if\Gm@includehead
\addtolength\@tempdima{\headheight}
\addtolength\@tempdima{\headsep}
\fi
\if\Gm@includefoot
\addtolength\@tempdima{\footskip}
\fi
\edef\Gm@height{\the\@tempdima}
\fi
\fi
\Gm@process The main macro processing the specified dimensions is defined.

\texttt{\def\Gm@process{}}
\texttt{\ifdef\Gm@process{}}
\texttt{\Gm@restore@org}
\else
\Gm@@process
\fi
\Gm@process The main processing macro.

\texttt{\ifdef\Gm@process{}}
\texttt{\Gm@expandlengths}
\texttt{\Gm@adjustpaper}
\texttt{\addtolength{\Gm@layoutwidth}{−\Gm@bindingoffset}}
\texttt{\Gm@adjustmp}
\texttt{\Gm@adjustbody}
\texttt{\Gm@dettall{h}{width}{lmargin}{rmargin}}
\texttt{\Gm@dettall{v}{height}{tmargin}{bmargin}}

\Gm@process
The real dimensions are set properly according to the result of the auto-completion calculation.

\setlength{\textwidth}{\Gm@width}%
\setlength{\textheight}{\Gm@height}%
\setlength{\topmargin}{\Gm@tmargin}%
\setlength{\oddsidemargin}{\Gm@lmargin}%
\addtolength{\oddsidemargin}{-1\Gm@truedimen in}%

If \texttt{include mp} is set to \texttt{true}, \texttt{\textwidth} and \texttt{\oddsidemargin} are adjusted.

\ifGm@includemp
\advance\textwidth{-\Gm@wd@mp}
\advance\oddsidemargin{\Gm@odd@mp}
\fi

Determining \texttt{\evensidemargin}. In the twoside page layout, the right margin value \Gm@rmargin is used. If the marginal note width is included, \texttt{\evensidemargin} should be corrected by \Gm@even@mp.

\if@mparswitch
\setlength{\evensidemargin}{\Gm@rmargin}%
\addtolength{\evensidemargin}{-1\Gm@truedimen in}%
\ifGm@includemp
\advance\evensidemargin{\Gm@even@mp}
\fi
\else
\evensidemargin{\oddsidemargin}
\fi

The bindingoffset correction for \texttt{\oddsidemargin}.

\ifGm@includehead
\addtolength{\textheight}{-\headheight}%
\addtolength{\textheight}{-\headsep}%
\else
\addtolength{\topmargin}{-\headheight}%
\addtolength{\topmargin}{-\headsep}%
\fi

If the foot of the page is included in \textit{total body}, \texttt{\headheight} and \texttt{\headsep} are removed from \texttt{\textheight}, otherwise from \texttt{\topmargin}.

\ifGm@includefoot
\addtolength{\textheight}{-\footskip}%
\fi

If \texttt{heightrounded} is set, \texttt{\textheight} is rounded.

\ifGm@heightrounded
\setlength{\@tempdima}{\textheight}%
\addtolength{\@tempdima}{-\topskip}%
\@tempcnta{\@tempdima}
\@tempcntb{\baselineskip}
\divide{\@tempcnta}{\@tempcntb}
\setlength{\@tempdimb}{\baselineskip}%
\multiply{\@tempdimb}{\@tempcnta}
\advance{\@tempdima}{-\@tempdimb}%
\multiply{\@tempdima}{\tw@}
\ifdim{\@tempdima}>\baselineskip%
\addtolength{\@tempdimb}{\baselineskip}%
\fi
\addtolength{\@tempdimb}{\topskip}%
\texttheight{\@tempdimb}
\fi

The paper width is set back by adding \Gm@bindingoffset.

\advance{\oddsidemargin}{\Gm@layoutoffset}%
\advance{\evensidemargin}{\Gm@layoutoffset}%
\advance{\topmargin}{\Gm@layoutvoffset}%
\addtolength{\Gm@layoutwidth}{\Gm@bindingoffset}%
\% end of \Gm@process

33
The macro checks the typeset environment and changes the driver option if necessary. To make the engine detection more robust, the macro is rewritten with packages `ifpdf`, `ifvtex` and `ifxetex`.

```latex
\def\Gm@detectdriver{% 
  If the driver option is not specified explicitly, then driver auto-detection works.
  \ifx\Gm@driver\@empty
    \typeout{*geometry* driver: auto-detecting}% 
    \ifpdf
      \ifpdf
        \Gm@setdriver{pdftex}% 
        \else
          \Gm@setdriver{dvips}% 
        \fi
      \else
        \Gm@setdriver{vtex}% 
      \fi
    \else
      \ifxetex
        \Gm@setdriver{xetex}% 
      \fi
    \fi
  \else
    \ifx\Gm@driver\Gm@xetex \%
      \ifxetex\else
        \Gm@warning{Wrong driver setting: 'xetex'; trying 'pdftex' driver}% 
        \Gm@setdriver{pdftex}
      \fi
    \fi
    \ifx\Gm@driver\Gm@vtex
      \Gm@warning{Wrong driver setting: 'vtex'; trying 'dvips' driver}% 
      \Gm@setdriver{dvips}
    \fi
  \fi
  \ifx\Gm@driver\relax
    \typeout{*geometry* detected driver: <none>}%
  \else
    \typeout{*geometry* detected driver: \Gm@driver}%
  \fi}%
\Gm@showparams
Prints the resulted parameters and dimensions to STDOUT if verbose is true. \Gm@width and \Gm@height are expanded to get the real size.

```
Macros for the page frames and cropmarks.

```
\def\Gm@cropmark(#1,#2,#3,#4){%
\begin{picture}(0,0)
\setlength\unitlength{1truemm}%
\linethickness{0.25pt}%
\put(#3,0){\line(#1,0){17}}%
\put(0,#4){\line(0,#2){17}}%
\end{picture}}%
\providecommand*\vb@xt@{\vbox to}%
\def\Gm@vrule{\vrule width 0.2pt height \textheight depth \z@}%
\def\Gm@hrule{\hrule height 0.2pt depth \z@ width \textwidth}%
\def\Gm@hruled{\hrule height \z@ depth 0.2pt width \textwidth}%
\newcommand*{\Gm@vrules@mpi}{%
\hb@xt@\@tempdima{\llap{\Gm@vrule}\ignorespaces%
\hskip \textwidth\Gm@vrule\hskip \marginparsep\llap{\Gm@vrule}\hfil\Gm@vrule}}%
\newcommand*{\Gm@vrules@mpii}{%
\hb@xt@\@tempdima{\hskip-\marginparwidth\hskip-\marginparsep\llap{\Gm@vrule}\ignorespaces%
\hskip \marginparwidth\rlap{\Gm@vrule}\hskip \marginparsep\llap{\Gm@vrule}\hskip\textwidth\rlap{\Gm@vrule}\hss}}%
\newcommand*{\Gm@pageframes}{%
\def\Gm@cropmark(#1,#2,#3,#4){%
\begin{picture}(0,0)
\setlength\unitlength{1truemm}%
\linethickness{0.25pt}%
\put(#3,0){\line(#1,0){17}}%
\put(0,#4){\line(0,#2){17}}%
\end{picture}}%
\providecommand*\vb@xt@{\vbox to}%
\def\Gm@vrule{\vrule width 0.2pt height \textheight depth \z@}%
\def\Gm@hrule{\hrule height 0.2pt depth \z@ width \textwidth}%
\def\Gm@hruled{\hrule height \z@ depth 0.2pt width \textwidth}%
\newcommand*{\Gm@vrules@mpi}{%
\hb@xt@\@tempdima{\llap{\Gm@vrule}\ignorespaces%
\hskip \textwidth\Gm@vrule\hskip \marginparsep\llap{\Gm@vrule}\hfil\Gm@vrule}}%
\newcommand*{\Gm@vrules@mpii}{%
\hb@xt@\@tempdima{\hskip-\marginparwidth\hskip-\marginparsep\llap{\Gm@vrule}\ignorespaces%
\hskip \marginparwidth\rlap{\Gm@vrule}\hskip \marginparsep\llap{\Gm@vrule}\hskip\textwidth\rlap{\Gm@vrule}\hss}}%
\newcommand*{\Gm@pageframes}{%
```
\ExecuteOptions is replaced with \Gm@setkey to make it possible to deal with \texttt{\langle key\rangle=\langle value\rangle} as its argument.

\Gm@processconfig
\let\Gm@origExecuteOptions\ExecuteOptions
\let\ExecuteOptions\Gm@setkeys
\InputIfFileExists{geometry.cfg}{}{}
\let\ExecuteOptions\Gm@origExecuteOptions

The original page layout before loading \texttt{geometry} is saved here. \Gm@restore@org is defined here for \texttt{reset} option.
\Gm@save
\edef\Gm@restore@org{\Gm@restore}

\Gm@initall

Processing config file.
\Gm@processconfig

The optional arguments to \texttt{\documentclass} are processed here.
\ProcessOptionsKV[c]{Gm}

Paper dimensions given by class default are stored.
\Gm@setdefaultpaper

The optional arguments to \texttt{\usepackage} are processed here.
\ProcessOptionsKV[p]{Gm}

Actual settings and calculation for layout dimensions are processed.
\Gm@process

\AtBeginDocument
The processes for \texttt{verbose}, \texttt{showframe} and drivers are added to \texttt{\AtBeginDocument}. \Gm@restore@org is redefined here with the paper size specified in the preamble for \texttt{\newgeometry} to use it. This should be done before magnifying the paper size with \texttt{\mag} because the layout calculation would be affected by changing the paper size.
\AtBeginDocument{%
\Gm@savelength{paperwidth}%
\Gm@savelength{paperheight}%
\edef\Gm@restore@org{\Gm@restore}%

The original paper size is used if \texttt{resetpaper}.
\if\Gm@resetpaper
\edef\Gm@pw{\Gm@orgpw}%
\edef\Gm@ph{\Gm@orgph}%
\else
\edef\Gm@pw{\the\paperwidth}%
\edef\Gm@ph{\the\paperheight}%
\fi

If \texttt{pass} is not set, the paper size is multiplied according to the specified \texttt{mag}.
\if\Gm@pass\else
\ifnum\mag=\texttt{0}\else
\divide\paperwidth\@m
\divide\paperheight\@m
\multiply\paperwidth{\the\mag}
\multiply\paperheight{\the\mag}
\fi
\fi

Checking the driver options.
\Gm@detectdriver

If \texttt{latex} and \texttt{pdftex} are defined, \texttt{\pdfpagewidth} and \texttt{\pdfpageheight} would be set.
\iflatex\Gm@driver\Gm@latex
\else
\edef\pdfpagewidth{\Gm@pw}%
\edef\pdfpageheight{\Gm@ph}%
\ifnum\mag=\texttt{0}\else
\edef\pdfpagewidth{\the\paperwidth}%
\edef\pdfpageheight{\the\paperheight}%
\fi
\fi
If `pdftex` is set to `true`, pdf-commands are set properly. To avoid `pdftex` magnification problem, \texttt{\pdfhorigin} and \texttt{\pdfvorigin} are adjusted for \texttt{\mag}.

\begin{verbatim}
\@ifundefined{pdfpagewidth}{}{%
  \setlength{\pdfpagewidth}{\Gm@pw}%
  \setlength{\pdfpageheight}{\Gm@ph}%
}\ifnum\mag=\@m\else
  \@tempdima=\mag sp%
\@ifundefined{pdfhorigin}{}{%
    \divide\pdfhorigin\@tempdima
    \multiply\pdfhorigin\@m
  }
\@ifundefined{pdfvorigin}{}{%
    \divide\pdfvorigin\@tempdima
    \multiply\pdfvorigin\@m
  }
\ifx\Gm@truedimen\Gm@true
  \setlength{\paperwidth}{\Gm@pw}%
  \setlength{\paperheight}{\Gm@ph}%
\fi
\fi
\fi
\end{verbatim}

With \texttt{VTeX} environment, \texttt{VTeX} variables are set here.

\begin{verbatim}
\ifx\Gm@driver\Gm@vtex
  \@ifundefined{mediawidth}{}{%
    \mediawidth=\paperwidth
    \mediaheight=\paperheight%
  }
\ifvtexdvi
  \AtBeginDvi{\special{papersize=\the\paperwidth,\the\paperheight}}%
\fi
\fi
\end{verbatim}

If `dvips` or `dvipdfm` is specified, paper size is embedded in dvi file with `\special`. For `dvips`, a landscape correction is added because a landscape document converted by `dvips` is upside-down in PostScript viewers.

\begin{verbatim}
\ifx\Gm@driver\Gm@dvips
\AtBeginDvi{\special{papersize=\the\paperwidth,\the\paperheight}}%
\ifx\Gm@driver\Gm@dvips\ifGm@landscape
\AtBeginDvi{\special{! /landplus90 true store}}%
\fi\fi
\else\ifx\Gm@driver\Gm@dvipdfm
\ifcase\ifx\AtBeginShipoutFirst\relax\@ne\else\z@\fi\fi
\AtBeginShipoutFirst{\special{papersize=\the\paperwidth,\the\paperheight}}%
\or
\AtBeginDvi{\special{papersize=\the\paperwidth,\the\paperheight}}%
\fi
\fi
\end{verbatim}

If `dvipdfm` is specified and `atbegshi` package in \texttt{‘oberdiek’} bundle is loaded, \texttt{\AtBeginShipoutFirst} is used instead of \texttt{\AtBeginDvi} for compatibility with `hyperref` and `dvipdfm` program.

\begin{verbatim}
\else\ifx\Gm@driver\Gm@dvipdfm
\\ifcase\ifx\AtBeginShipoutFirst\relax\@ne\else\z@\fi\fi
\AtBeginShipoutFirst{\special{papersize=\the\paperwidth,\the\paperheight}}%
\or
\AtBeginDvi{\special{papersize=\the\paperwidth,\the\paperheight}}%
\fi
\fi
\end{verbatim}

Page frames are shipped out when \texttt{showframe=\true}, cropmarks for \texttt{showcrop=\true} on each page. The \texttt{atbegshi} package is used for overloading `\shipout`.

\begin{verbatim}
\@tempswafalse
\ifGm@showframe
\@tempswatrue
\else\ifGm@showcrop
\@tempswatrue
\fi\fi
\if@tempswa
\RequirePackage{atbegshi}%
\AtBeginShipout{\setbox\AtBeginShipoutBox=\vbox{%
\end{verbatim}
The layout dimensions for \restoregeometry are saved at the end of the \AtBeginDocument.

The package checks whether or not the marginpars overrun the page, if verbose and unless pass.

\Gm@showparams puts the resulting parameters and dimensions into the log file. With verbose, they are shown on the terminal as well.

The following lines free the memories no longer needed.

The macro \geometry can be called multiple times in the preamble (before \begin{document}).

The macro, which can be called from \newgeometry, \restoregeometry and \loadgeometry, changes the layout in the middle of the document.

\newcommand{\newgeometry}{[1]}% \Gm@clean \setkeys{Gm}{#1}% \Gm@newgmtrue \Gm@process \Gm@newgmfalse \Gm@process \ifnum\mag=\@m\else\Gm@magtooffset\fi \Gm@changelayout \Gm@showparams{newgeometry}}%

\restoregeometry The macro restores the resulting layout specified in the preamble, namely the first-page layout right after \begin{document}.

\savegeometry The macro saves the layout with the name specified with the argument. The saved layout can be loaded with \loadgeometry{⟨name⟩}.

\newcommand*{\savegeometry}{[1]}%
1091 \Genericounter{save}
1092 \expandafter\edef\csname Gm@restore@@#1\endcsname{\Gm@restore}}\
1093 \loadgeometry The macro loads the layout saved with \savegeometry{\textit{name}}. If the name is not found, the macro
1094 would warn it and do nothing for the layout.
1095 \newcommand*{\loadgeometry}[1]{%  
1096 \clearpage\@ifundefined{Gm@restore@@#1}{%  
1097 \PackageError{geometry}{%  
1098 \string\loadgeometry : name '#1' undefined}{%  
1099 The name '#1' should be predefined with \string\savegeometry}{%  
1100 \Gm@changelayout}}%
1101}(/package)

12 Config file

In the configuration file geometry.cfg, one can use \ExecuteOptions to set the site or user default
1102 settings.
1103 ⟨∗config⟩%<<SAVE_INTACT
1104 % Uncomment and edit the line below to set default options.
1105 %\ExecuteOptions{a4paper}%
1106 %SAVE_INTACT
1107 ⟨/config⟩

13 Sample file

Here is a sample document for the geometry package.
1110 ⟨∗samples⟩%<<SAVE_INTACT
1111 \documentclass[12pt]{article}% uses letterpaper by default
1112 % \documentclass[12pt,a4paper]{article}% for A4 paper
1113 %---------------------------------------------------------------
1114 % Edit and uncomment one of the settings below
1115 %---------------------------------------------------------------
1116 % \usepackage{geometry}
1117 % \usepackage[centering]{geometry}
1118 % \usepackage[width=10cm, vscale=.7]{geometry}
1119 % \usepackage[margin=1cm, papersize=[12cm,19cm], resetpaper]{geometry}
1120 % \usepackage[margin=1cm, includeheadfoot]{geometry}
1121 % \usepackage[margin=1cm, bindingoffset=1cm, twoside]{geometry}
1122 % \usepackage[marginratio=2:1, vmargin=2cm]{geometry}
1123 % \usepackage[margin=1cm, includemp]{geometry}
1124 % \usepackage[headsep=20pt, head=40pt, foot=20pt, includeheadfoot]{geometry}
1125 % \usepackage[text={6in,8in}, top=2cm, left=2cm]{geometry}
1126 % \usepackage[hscale=0.5, twoside]{geometry}
1127 % \usepackage[hscale=0.5, asymmetric]{geometry}
1128 % \usepackage[hscale=0.5, headheight=1cm]{geometry}
1129 % \usepackage[left=1cm, right=4cm, top=2cm, includefoot]{geometry}
1130 % \usepackage[lines=20, left=2cm, right=6cm, top=2cm, twoside]{geometry}
1131 % \usepackage[width=15cm, marginparwidth=3cm, includemp]{geometry}
1132 % \usepackage[margin=1cm, includeheadfoot, includemp]{geometry}
1133 % \usepackage[margin=1cm, bindingoffset=1cm, twoside]{geometry}
1134 % \usepackage[marginratio=2:1, vmargin=2cm]{geometry}
1135 % \usepackage[headsep=20pt, head=40pt, foot=20pt, includeheadfoot]{geometry}
1136 % \usepackage[text={6in,8in}, top=2cm, left=2cm]{geometry}
1137 % \usepackage[centering, includemp, twoside, landscape]{geometry}
1138 % \usepackage[margin=1414, margin=2cm]{geometry}
1139 % \usepackage[margin=1414, margin=2truecm, trueitems]{geometry}
1140 % \usepackage[a5paper, landscape, twocolumn, twoside,
1141 left=2cm, marginratio=2:1, includemp, marginparwidth=43pt,
1142 bottom=1cm, foot=.7cm, includemp, textheight=11cm, heightrounded,
1143 columns sep=1cm, verbose]{geometry}
\usepackage{lipsum}% for dummy text of 150 paragraphs
\newcommand\mynote{\marginpar\[
\raggedright
A sample margin note in the left side.\]
\raggedright A sample margin note.}}%
\newcommand\myfootnote{\footnote{This is a sample footnote text.}}%
\begin{document}
\lipsum\[1-2]\mynote\lipsum\[3-4]\mynote
\lipsum\[5-11]\mynote\lipsum\[12]\myfootnote
\lipsum\[13-22]\mynote\lipsum\[23-32]
\end{document}