# Fit graphics on a page\*†

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#### Abstract

The fitbox package allows a box (usually an \includegraphics box) to fit on the page. It scales the box to the maximal allowed size within the user-set limits. If there there is not enough space on the page, the box is moved to the next one.

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#### 1 Introduction

How often one puts a picture on a page only to see that LATEX decides to move it to the next one because there is not enough space—while shaving a millimeter off the height would make the difference? This package is intended to alleviate this difference. It uses several strategies to fit a picture on the page, and only if they fail, the picture is moved to the next one.

#### 2 User Guide

#### 2.1 Installation

The installation of the class follows the usual practice [1] for LATEX packages:

- 1. Run latex on fitbox.ins. This will produce the file fitbox.sty.
- 2. Put the file fitbox.sty to the place where LATEX can find it (see [1] or the documentation for your TEX system).
- 3. Update the database of file names. Again, see [1] or the documentation for your T<sub>F</sub>X system for the system-specific details.
- 4. The file fitbox.pdf provides the documentation for the package

As an alternative to items 2 and 3 you can just put the files in the working directory where your .tex file is.

#### 2.2 Usage

To use the package, add to the preamble of your document

\usepackage{fitbox}

\fitbox

The main command of the package is  $\{stuff\}$ . The  $\{\langle stuff\}\}$  will be typeset in a box according to the  $[\langle options\rangle]$ . In most cases  $\{\langle stuff\}\}$  is an  $\includegraphics$  command, but anything that fits into an LR-box can be typeset in this way.

The  $\{\langle stuff \rangle\}$  is typeset in a box, and then the box is put on the page according to the following algorithm:

- 1. TeX starts a new paragraph.
- 2. The box is scaled up to the maximal dimensions specified by the user (while keeping the aspect ratio).
- 3. If there is not enough space on the page to fit the box, the latter is scaled down as neccessary, but no smaller than the minimal dimensions specified by the user.

- 4. If there is still not enough space, T<sub>E</sub>X tries to enlarge the page up to the specified limit.
- 5. If this also fails, T<sub>E</sub>X starts a new page and fits the box there.

\fitboxset

The options can be set individually for each \fitbox command, or globally using the command \fitboxset, for example,

\fitboxset{maxwidth=\textwidth, minwidth=\fitboxnatwidth}

# \fitboxnatwidth \fitboxnatheight

The options of the package use key-value interface. Often the values are dimensions; in these cases the special dimensions \fitboxnatwidth and \fitboxnatheight can be used; they are equal to natural dimensions of the box. Note that height and \fitboxnatheight are actually total heights, including both height and depth of the corresponding boxes. For example,

\fitboxeset{minheight=0.5\fitboxnatheight}

means that the box cannot be scaled down more than 50%.

The following options are recognized:

maxheight: The maximal total height of the box. By default \textheight.

maxwidth: The maximal width of the box. By default \textwidth.

minheight: The minimal height of the box. By default \fitboxnatheight.

minwidth: The minimal width of the box. By default \fitboxnatwidth.

**belowboxspace:** The height of the space that must be left below the box (e.g. for a caption). By default zero.

maxenlargepage: The maximal amount to add to the current page. By default zero.

### 3 Implementation

1 (\*style)

#### 3.1 Setting up parameters

\fitboxnatheight The total height of the box

2 \newdimen\fitboxnatheight

\fitboxnatwidth The total width of the box

3 \newdimen\fitboxnatwidth

We use xkeyval interface:

- 4 \RequirePackage{xkeyval}
- 5 \define@cmdkeys{FTBX}{maxheight, minheight, maxwidth, minwidth,
- 6 belowboxspace, maxenlargepage}

\fitboxset Setting everything

7 \def\fitboxset#1{\setkeys{FTBX}{#1}}

The defaults

- 8 \fitboxset{maxheight=\textheight, minheight=\fitboxnatheight,
- 9 maxwidth=\textwidth, minwidth=\fitboxnatwidth,
- 10 belowboxspace=Opt, maxenlargepage=Opt}

#### 3.2 Main command

\FTBX@box The box which will held the stuff to be typeset

11 \newbox\FTBX@box

\FTBX@desired@maxheight The desired maximal height @desired@maxheight

\FTBX@desired@minheight The desired minimal height @desired@minheight

\FTBX@available@height The desired available height @available@height

\fitbox The main command

12 \newcommand\fitbox[2][]{\leavevmode

- 13 \fitboxset{#1}%
- 14 \setbox\FTBX@box=\hbox{#2}%
- 15 \fitboxnatwidth=\wd\FTBX@box\relax
- 16 \fitboxnatheight=\ht\FTBX@box\relax
- 17 \advance\fitboxnatheight by \dp\FTBX@box\relax
- 18 % Checking the sizes
- 19 \expandafter\ifdim\cmdKV@FTBX@minwidth>\columnwidth\relax
- 20 \PackageWarning{fitbox}{Minimal width is larger than page
- 21 width. Adjusting...}%
- 22 \def\cmd@KV@FTBX@minwidth{\columnwidth}%
- 23 \fi

```
\expandafter\ifdim\cmdKV@FTBX@maxwidth>\columnwidth\relax
24
        \PackageWarning{fitbox}{Desired width is larger than page
25
          width. Adjusting...}%
26
        \def\cmd@KV@FTBX@maxwidth{\columnwidth}%
27
    \fi
28
29
    \expandafter\ifdim\cmdKV@FTBX@minheight>\textheight\relax
30
        \PackageWarning{fitbox}{Minimal height is larger than page
31
          height. Adjusting...}%
        \def\cmd@KV@FTBX@minheight{\textheight}%
32
    \fi
33
    \expandafter\ifdim\cmdKV@FTBX@maxheight>\textheight\relax
34
35
        \PackageWarning{fitbox}{Desired height is larger than page
          height. Adjusting...}%
36
        \def\cmd@KV@FTBX@maxheight{\textheight}%
37
    \fi
38
    % Calculating the minimal and maximal height
39
    40
    \FTBX@desired@maxheight=\@tempa\fitboxnatheight\relax
41
    \expandafter\ifdim\cmdKV@FTBX@maxheight<\FTBX@desired@maxheight\relax
42
43
       \expandafter\FTBX@desired@maxheight=\cmdKV@FTBX@maxheight\relax
44
    \Gscale@div{\@tempa}{\cmdKV@FTBX@minwidth}{\fitboxnatwidth}%
45
    \FTBX@desired@minheight=\@tempa\fitboxnatheight\relax
46
    \expandafter\ifdim\cmdKV@FTBX@minheight>\FTBX@desired@minheight\relax
47
       \expandafter\FTBX@desired@minheight=\cmdKV@FTBX@minheight\relax
48
49
    \ifdim\FTBX@desired@minheight>\FTBX@desired@maxheight\relax
50
        \PackageWarning{fitbox}{Desired min scale exceeds desired min
51
          scale. Adjusting...}%
52
        \FTBX@desired@minheight=\FTBX@desired@maxheight\relax
53
    \fi
54
    \FTBX@available@height=\pagegoal\relax
55
56
    \ifdim\FTBX@available@height>\vsize\relax
57
      \FTBX@available@height=\vsize
58
    \advance\FTBX@available@height by -\pagetotal\relax
59
    \advance\FTBX@available@height by -\cmdKV@FTBX@belowboxspace\relax
60
    \advance\FTBX@available@height by -\baselineskip\relax
61
    \ifdim\FTBX@desired@maxheight>\FTBX@available@height\relax
62
       \ifdim\FTBX@available@height<\FTBX@desired@minheight\relax
63
64
          \@tempdima=\FTBX@desired@minheight\relax
          \advance\@tempdima by
65
          -\FTBX@available@height\relax
66
          \expandafter\ifdim\cmdKV@FTBX@maxenlargepage<\@tempdima\relax
67
            \newpage
68
69
            \resizebox*{!}{\FTBX@desired@maxheight}{\box\FTBX@box}%
70
71
            \enlargethispage{\@tempdima}%
            \resizebox*{!}{\FTBX@desired@minheight}{\box\FTBX@box}%
72
73
          \fi
```

```
74 \else  
75 \resizebox*{!}{\FTBX@available@height}{\box\FTBX@box}%  
76 \fi  
77 \else  
78 \resizebox*{!}{\FTBX@desired@maxheight}{\box\FTBX@box}%  
79 \fi  
80 }  
81 \langle /\text{style} \rangle
```

# References

[1] UK TEX Users Group. UK list of TEX frequently asked questions. http://www.tex.ac.uk/cgi-bin/texfaq2html, 2015.

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Numbers written in italic refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in roman refer to the code lines where the entry is used.

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