

# Fit graphics on a page<sup>\*†</sup>

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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 L<sup>A</sup>T<sub>E</sub>X 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 L<sup>A</sup>T<sub>E</sub>X packages:

1. Run `latex` on `fitbox.ins`. This will produce the file `fitbox.sty`.
2. Put the file `fitbox.sty` to the place where L<sup>A</sup>T<sub>E</sub>X can find it (see [1] or the documentation for your T<sub>E</sub>X system).
3. Update the database of file names. Again, see [1] or the documentation for your T<sub>E</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 `\fitbox[options]{stuff}`. The `{stuff}` will be typeset in a box according to the [*options*]. In most cases `{stuff}` is an `\includegraphics` command, but anything that fits into an LR-box can be typeset in this way.

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

1. T<sub>E</sub>X 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 necessary, 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`      The options of the package use key-value interface. Often the values  
`\fitboxnatheight` 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 the size of the current box to be constructed.

**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 `\langle*style\rangle`

#### 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=\hsize, minwidth=\fitboxnatwidth,`  
10 `belowboxspace=0pt, maxenlargepage=0pt}`

#### 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 too large. Consider`  
21 `changing it to \the\hsize}%`  
22 `\fi`  
23 `\expandafter\ifdim\cmdKV@FTBX@maxwidth>\hsize\relax`

```

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

```

74 \fi

75 }

76 \end{style}

## References

- [1] UK T<sub>E</sub>X Users Group. UK list of T<sub>E</sub>X frequently asked questions. <http://www.tex.ac.uk/cgi-bin/texfaq2html>, 2015.

## Change History

v1.01	the width . . . . .	4
\fitbox: Do not force adjusting	General: Changed maximal width .	4



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