Two-column documents in LaTeX

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Abstract

LaTeX has some facilities for typesetting documents in two columns. This example shows how it is done, and illustrates a few of the techniques and pitfalls. In particular, it shows how to get a one-column abstract and title with the rest of the document in two columns, without having a new page start below the abstract. The options for floating figures are also explained. The multicol package is mentioned, but its use is not recommended for two column reports.

1 Introduction

There are good reasons for typesetting an article in two columns. It allows use of more of the width of the paper, in a smaller font, without the eye having to make too long a jump from the end of one line to the start of the next. This is the reason why so many scientific journals are set in two columns. Many journals provide their own two-column LaTeX templates, but it is often desireable to set other reports in two columns without needing to conform to a given journal's style. In this example, I show how produce a two-column report with minimal additional packages.

2 Two columns

A two colum report is produced by replacing

```
\documentclass[blah]{article}
```

with

```
\documentclass[blah,twocolumn]{article}
```

Here, `blah` is whatever options to `\documentclass` you had already in place. And that is it! But it turns out that as soon as you do that, you find out that there are a number of pitfalls.

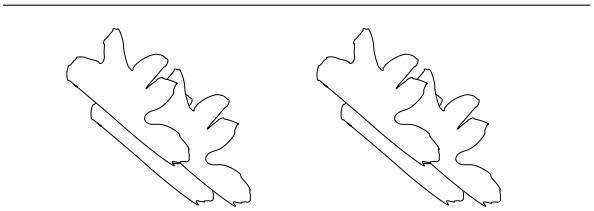

Figure 1: This picture is in a standard figure float. This means that LaTeX will put it in a suitable position in a column, somewhere close to where you put it in your LaTeX source.

3 The abstract

Pitfall 1 is the abstract. If you use the usual `\begin{abstract}` and `\end{abstract}` commands, the abstract ends up in the first column and is no longer in a smaller font. A nicer result is obtained by putting `\usepackage{abstract}` in the preamble and including the abstract like this:

```
\twocolumn[
\maketitle % need full-width title
\begin{onecolabstract}
  Your abstract text here
\end{onecolabstract}
]
```

The default width of the one-column abstract seems

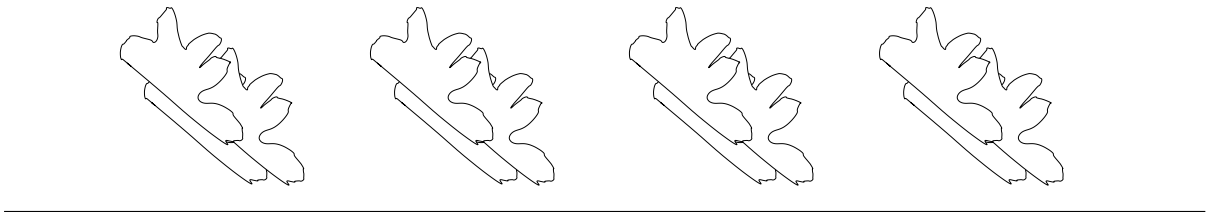

Figure 2: This picture is in a double-width figure float. This means that LaTeX will put it at the top of the next page of text from where you asked for it, or on a page containing only double-width figures.

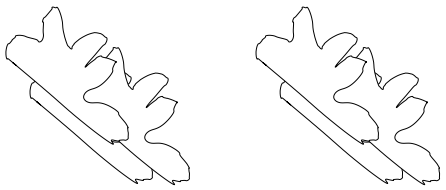

Figure 3: Another single-column figure

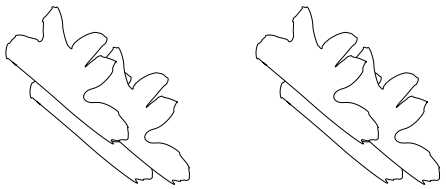

Figure 4: Yet another single-column figure

a bit wide to me. You can control the width by putting these two statements into your preamble:

```
\setlength{\absleftindent}{3cm}
\setlength{\absrightindent}{3cm}
```

You can adjust the two lengths from `3cm` to suit your taste.

4 Figures

The familiar figure environment, created with `\begin{figure}[htbp]` and `\end{figure}`, works much as you have probably come to expect. It puts its figures into a column with the text. Figure 1 shows an example. The letters `htbp` mean here, top of a column, bottom of a column and in a column (not a page) with only figures and no text. As usual with floats in LaTeX, it is wise to not to restrict the placement options and to allow LaTeX plenty of freedom about where the figures are placed. However, LaTeX's default setting of `\begin{figure}[tbp]` has a tendency to create columns with a couple of figures and a lot of empty space; Figs 3 and 4 are examples of this happening. To avoid this it is worth experimenting with `\begin{figure}[htb]`.

The two-column environment provides a second type of figure created with `\begin{figure*}` and `\end{figure*}`. This type of figure spans the width of two columns; figure 2 is an example. Note that the only placement options for a two-column figure are at the top of the next page, or on a page with only figures. You should use a two-column figure wherever one is necessary to ensure that the detail on your figure is clear. Be warned, however, that they can make the usual difficulties with LaTeX's figure placement even more frustrating.

5 Mathematics

A serious pitfall with two-column text is that even a moderately long displayed formula may be too long for your columns. For example, consider this power series:

$$y = a_0+a_1x+a_2x^2+a_3x^3+a_4x^4+a_5x^5+\cdots+a_nx^n+\cdots$$

LaTeX has squeezed that rather tightly, but the dots at the end nevertheless extend outside the boundaries of the column of text. If your report is likely to have long formulæ then you probably want to avoid the two-column layout.

6 Another alternative

What should you do if you find two columns insufficient and want more? You can try using the multicol package. I am not going to demonstrate this here as it is of limited use for scientific reports. The multicol package is usually **not** the right way to obtain two columns. The main difficulty with it is that placement of floats does not work inside the multi-column environment, meaning that you have to place every figure yourself.