

seemed to be a computation done only rarely is in fact done very frequently and chomps away at the time.

That clue clearly indicates that if we can stop the recursion at an even earlier stage before it gets to the null sets it may pay off even more handsomely. The sets of size 1 are trivial to enumerate so let's take advantage of that with one extra line:

```
...
  if(r == 0) v0 else
  if(r == 1) matrix(v, n, 1) else
  ## the extra line
  if(r == n) matrix(v, 1, n) else
...
```

Now according to profiling on my machine the time

for the same computation drops to just 12.32 seconds, less than one-third the original.

The story does not end there, of course. It seemed to me you could really make this computation zing (at the expense of memory, but hey, this is the 21st century) if you found a way to cache and re-use partial results as you went along. I did find a way to do this in S but using frame 0 or frame 1. Then Doug Bates neatly ported it to R making very astute use of the R scoping rules, function closures and environments, but that is another story for another time.

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Writing Articles for R News

or how (not) to ask for Christmas presents.

by *Friedrich Leisch*

Preface

When I wrote the call for articles for this first edition of R News on the evening of December 20, 2000 on my home laptop I shortly thought about which formats to accept. The decision that the newsletter itself would be produced in \LaTeX had long been made, in fact we almost never use something different for text processing. I do a lot of interdisciplinary research with people from the management sciences where MS Word is the predominant text processor and hence am often confronted with conversion between '.doc' and '.tex' files when writing joint papers.

If the text uses only trivial markup (section headers, ...), then conversion is not too hard, but everybody can easily learn the little \LaTeX that is involved in that, see the examples below. However, once mathematical equations or figures are involved, I know of no conversion that does not need considerable manual fixing to get a decent result (and we have tried a lot of routes). I considered including some words on Word, but then I thought: "Well, the email goes to r-devel, people that may be used to writing '.Rd' files—the format of R help files which is not unlike \LaTeX —probably everybody knows \LaTeX anyway, let's simply see if anybody really wants to write in Word.", sent the email and went to bed. Bad mistake...

The next day I had meetings in the morning and my first chance to read email was in the afternoon. To keep it short: I had started one of the perhaps most emotional (and longest) threads on r-devel so far, and as there is no such thing as a universal *best*

word processing paradigm, there was of course also no "winner" in the discussion. So all I could add to the pro- \LaTeX arguments 18 hours after my first email is that this editorial decision had already been made. I want to use this article to apologize to all for not being more detailed in my email that started the thread and explain the decision.

As all of R, R News is a volunteer project. We have no staff to do the editing or layouting etc., hence the editors have to "outsource" as much as possible to you, the prospective authors. This will only work if all use the same format, because—as explained above—automatic conversion simply does not work in practice. I know that the majority of R developers use \LaTeX , hence the decision was not too hard which paradigm to choose.

The structure of R News articles

Figure 7 shows parts of the source code for this article. \LaTeX is a markup language like, e.g., HTML and mixes layout commands and contents in a single text file (which you can write in any editor you like, or even Word). Most commands start with a backslash, arguments to the commands are usually given in curly brackets. We first specify the title, subtitle and author of the article and then issue the command `\maketitle` to actually typeset it, update the table of contents and PDF bookmarks. The command `\section*{}` starts a new section (`\section{}` starts sections without numbering them, `\section*{}` without the star would add numbers), and then we can simply enter the main text, separating paragraphs by blank lines.

The command `\file{}` has been defined by us to typeset file names in a different font and enclose them in single quotes. Finally we specify the au-

```

\title{Submitting to R News}
\subtitle{or how (not) to ask for Christmas presents.}
\author{by Friedrich Leisch}

\maketitle

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sciences where MS Word is the predominant text processor and hence am
often confronted with conversion between \file{.doc} and \file{.tex}
files when writing joint papers.

If the text uses ...

\address{Friedrich Leisch\\
  Technische Universität Wien, Austria\\
\email{Friedrich.Leisch@ci.tuwien.ac.at}}

```

Figure 7: The \LaTeX source code of this article

thor's affiliation using our commands `\address{}` and `\email{}`. The double backslash in the code breaks lines (by default \LaTeX treats single newlines just as whitespace). That's it, no magic involved at all.

The document style file for R News is still under constant changes while we are busy laying out this first issue, we will publish it on R's homepage as soon as we think that the interface is stable enough. There will also be a more in-depth guide for using it, that is beyond the scope of this article.

Graphics

In principle, graphics are much easier to convert between different formats than complete documents, and there are a number of good (and free) conversion tools available. One notable exception is WMF, the *Windows Meta Format*, which is hard to deal with on Unix-type platforms like our Linux machines.

Most graphics in this newsletter will probably be

produced using R itself. In this case, we strongly prefer EPS (Encapsulated Postscript) format, which can easily be produced using R's `dev.copy2eps()` function on all platforms.

Summary

People being literate in \LaTeX can write articles very much like it were a stand-alone document. For the moment, simply use the 'twocolumn' option for laying out. The 'Rnews.sty' file will be made available as soon as possible. For others we will publish example articles on the web, and as long as you do not need special layouting it should be an easy go. Of course, typesetting mathematical equations in \LaTeX (where its real strength is) is something completely different ...

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