

How to incorporate the proper R citation into you **Sweave** documents

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1 Overview of Making Bibliographies in \LaTeX

According to Antoni Diller's *LaTeX Line by Line* (2nd edition; a book I highly recommend), BibTeX is a widely available system used for producing bibliographies in conjunction with \LaTeX (see Chapter 6).

In order to use it you first have to create a file with extension `.bib` containing a sequence of entries and then in your \LaTeX input file it is necessary to include `\cite` commands and some additional commands peculiar to BibTeX which tell it how to format the bibliography it produces and what the names of the `.bib` files containing database entries are that it should use.

The `citation` and `toBibtex` functions in R produce the entry output that you need to place (and modify slightly) in the `.bib` file:

```
> citation()
```

To cite R in publications use:

```
R Development Core Team (2006). R: A language and environment for  
statistical computing. R Foundation for Statistical Computing,  
Vienna, Austria. ISBN 3-900051-07-0, URL http://www.R-project.org.
```

A BibTeX entry for LaTeX users is

```
@Manual{,  
  title = {R: A Language and Environment for Statistical Computing},  
  author = {{R Development Core Team}},  
  organization = {R Foundation for Statistical Computing},  
  address = {Vienna, Austria},  
  year = {2006},  
  note = {{ISBN} 3-900051-07-0},  
  url = {http://www.R-project.org},
```

```
}
```

We have invested a lot of time and effort in creating R, please cite it when using it for data analysis. See also 'citation("pkgname)" for citing R packages.

```
> toBibtex(citation())
```

```
[[1]]
@Manual{,
  title = {R: A Language and Environment for Statistical Computing},
  author = {{R Development Core Team}},
  organization = {R Foundation for Statistical Computing},
  address = {Vienna, Austria},
  year = {2006},
  note = {{ISBN} 3-900051-07-0},
  url = {http://www.R-project.org},
}
```

Copy and paste the `toBibtex(citation())` output to a file. For this demonstration, I copied and pasted the output to `Rbiblioref.bib` and saved the file in my home directory (`/home/scottt`). If you plan to reference the R citation in many of your Sweave documents, I would recommend saving the `.bib` file that you create in your home directory so you can reference the file from any of your project directories.

A `.bib` file contains one or more entries which look something like the R citation you copied and pasted. The general form of such an entry is *publication-type*{*key*, *field-list*}. Chapter 6 of Diller's book cover the available possibilities for *publication-type* in great detail. For the R citation, the *publication-type* is `@manual`, which is used for manuals and similar kinds of technical documentation.

What we need to modify in the R citation entry in the `.bib` file is the *key*, which is what will appear in any `\cite` commands that you use to refer to the publication in question. The *key* is made up of letters, numerals and punctuation other than the comma. For this demonstration, I modified the blank key produced by `toBibtex(citation())` to `rdct:r` in the `Rbiblioref.bib` file. Therefore, when we want to cite the R reference in our Sweave file, we will use `\cite{rdct:r}`. Section 4.9 of Diller covers the `\cite` command and the alternative `thebibliography` environment in \LaTeX in much greater detail.

After this change, your `.bib` file should look something like this:

```
@Manual{rdct:r,
  title = {R: A Language and Environment for Statistical Computing},
  author = {{R Development Core Team}},
  organization = {R Foundation for Statistical Computing},
```

```

address = {Vienna, Austria},
year = {2006},
note = {{ISBN} 3-900051-07-0},
url = {http://www.R-project.org},
}

```

Now we need to discuss how to get BibTeX to produce a bibliography for you. In order to do so, it is necessary to include a `\bibliographystyle` and a `\bibliography` command inside the `document` environment of your Sweave (i.e., input) file. The `\bibliographystyle` command usually comes immediately after the `\begin{document}` command, but it has to come before any `\cite` commands; and the `\bibliography` command usually comes close to the end of the `document` environment in the place where you want the bibliography produced to occur.

The general style of the `\bibliographystyle` command is `\bibliographystyle{bib-style}`, where *bib-style* can be `plain`, `unsrt`, `abbrv`, or `alpha`. For this demonstration, I used `\bibliographystyle{plain}`, which will produce “regular” bibliography in which the entries are sorted automatically by BibTeX.

The general format of the `\bibliography` command is `\bibliography{bib-file-list}`, where *bib-file-list* is a list of the first or base names of one or more `.bib` files. Note, if the list contains more than one member, then they should be separated by commas. For this demonstration, I specified `\bibliography{\home\scottt\Rbiblioref.bib}` one line above the `\end{document}` command. Using the absolute reference of `Rbiblioref.bib` (i.e., `\home\scottt\Rbiblioref.bib`) allows me to reference the file from any project subdirectory.

Look at the `.nw` version of this file to make sure you understand where to place the `\bibliographystyle` and `\bibliography` commands.

Once we have our `.bib` and Sweave files all set, and we’ve referenced the R citation at least once using the appropriate `\cite` command, we need to run our Sweave file through the proper sequence of programs in order for the bibliography to be generated correctly. We first need to run our Sweave file through `Sweave` in order to generate the `.tex` file. We then need to run our `.tex` file through `LATEX` (`latex`) at least twice in order to get the cross-referencing information of our bibliography into our output – the first time you run `LATEX` the information in the `.bib` file is written to the `.aux` file and the next time you run `LATEX` this information is used to generate the labels that appear in your output. After running `Sweave` and `latex` twice, you need to run `bibtex` in order to process the input file using BibTeX. Lastly, we can run our file through `pdflatex` (at least twice) to convert the `LATEX` output into a `.pdf` file.

A shortcut to use from the console command line in order to run our input file through all of these programs is the `&&`:

```
Sweave RCitation && latex RCitation && latex RCitation &&
bibtex RCitation && pdflatex RCitation && pdflatex RCitation
```

where `RCitation` is the name of my `.nw` file. Placing `&&` in between each command allows you to run several commands from the same command line, and the sequence of commands will terminate wherever along the line an error occurs.

2 Citing R in your Sweave document

In order to properly cite R and the packages you've used in your `Sweave` document, my suggestion is to include the following sentence in your `.nw` file:

```
All analyses were performed using the R statistical software
\Sexpr{R.Version()$version.string} \cite{rdct:r}.
```

`\Sexpr{R.Version()$version.string}` will place the version of R you are currently using, which is the output of running `R.Version()$version.string` from the R command line, into your sentence. `\cite{rdct:r}` will properly insert a reference to the R citation.

The finished output of the above sentence will look something like the following, inserting the bibliography at the end of the file:

All analyses were performed using the R statistical software Version 2.3.1 (2006-06-01) [4]. Specific analyses were performed using the `Hmisc` [3], `Design` [2], and `maps` [1] packages.

References

- [1] Original S code by Richard A. Becker and Allan R. Wilks. R version by Ray Brownrigg Enhancements by Thomas P Minka <surname@stat.cmu.edu>. *maps: Draw Geographical Maps*, 2005. R package version 2.0-27.
- [2] Frank E Harrell Jr. *Design: Design Package*, 2005. R package version 2.0-12.
- [3] Frank E Harrell Jr and with contributions from many other users. *Hmisc: Harrell Miscellaneous*, 2006. R package version 3.0-12.
- [4] R Development Core Team. *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria, 2006. ISBN 3-900051-07-0.