

# Examples for `ltxsparklines` package

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## 1 Setting up

The package `ltxsparklines` uses `L`ATEX package `sparklines` [Löffler and Luecking, 2016] for drawing sparklines in `T`EX documents: probably prepared with `Sweave` or `knitr` (but you are, of course, may choose other methods to generate `T`EX documents). Accordingly, put in the preamble of your `L`ATEX file `\usepackage{sparklines}`.

Many parameters that determine how do sparklines look are defined in the `T`EX file rather than in `R`. Here are some global parameters with the values chosen for this document:

```
% The height of the sparklines in ex units
\renewcommand\sparklineheight{1.75}
% The line width
\setlength\sparklinethickness{0.4pt}
% The color of the sparkline
\definecolor{sparklinecolor}{named}{blue}
% The color of the sparkline rectangle when present
\definecolor{sparkrectanglecolor}{gray}{0.8}
% The dot width
\setlength\sparkdotwidth{2pt}
```

```

% The color of the spikes
\definecolor{sparkspikecolor}{named}{red}
% The color of the bottom line when present
\definecolor{bottomlinecolor}{gray}{0.2}
% The thickness of the bottom line
\setlength\sparkbottomlinethickness{.2pt}
% The clipping separation (need sparklines v1.7 or later)
\setlength\sparklineclipsep{1pt}

```

Now we call the library and setting the options.

```
> library(ltxsparklines)
```

The most important option is `ltxsparklines.output`. The package produces a string to be included in the  $\TeX$  file. Being a  $\TeX$  command, the string contains many backslashes. Unfortunately the ways *knitr* and *Sweave* treat backslashes are different. Moreover, *Sweave* uses different techniques in inline expressions (those within  $\Sexpr$ ) and chunks created with `results=tex` option. To make the long story short,

1. Use `output='inlineSweave'` for *Sweave*  $\Sexpr$ .
2. Use `output='knitr'` everywhere else, *including Sweave chunks!*


This document was created in *Sweave*, since the line

```
> options(ltxsparklines.output='inlineSweave') # Comment out
>                                               # if using knitr
```

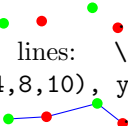

The other options are mostly self-explanatory; try `help(ltxsparklines)` for more details:




```
> options(
+   ltxsparklines.width = 10,
+   ltxsparklines.clip = FALSE,
+   ltxsparklines.na.rm = TRUE,
+   ltxsparklines.bottomline = FALSE,
+   ltxsparklines.bottomlinex = c(NA, NA),
+   ltxsparklines.startdotcolor = NA,
+   ltxsparklines.enddotcolor = NA,
+   ltxsparklines.dotcolor='blue'
+ )
```


## 2 Some simple examples


The package can take quite versatile input data. You can give it two vectors, one for  $x$ , another for  $y$  coordinates of the sparkline: `\Sexpr{sparkline(x=c(1,4,8,10), y=c(5,6,12,3), enddotcolor='red')}` 



If you use `xspikes` and `yspikes` instead, you will have a small bar chart (or *spike chart*): `\Sexpr{sparkline(xspikes=c(1,4,8,10), yspikes=c(5,6,12,3), width=3)}...`

You can even make a sort of a scatter plot with dots: `\Sexpr{sparkline(xdots =c(1,4,8,10), ydots=c(5,6,12,3), dotcolor=c('green', 'red'))}` . In most cases, however, you probably want to combine dots and lines: `\Sexpr{sparkline(x =c(1,4,8,10), y=c(5,6,12,3), xdots=c(1,4,8,10), ydots=c(5,6,12,3), dotcolor=c('green', 'red'))}` .


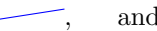

Instead of a pair of vectors you can use a matrix; in this case  $x$  and  $y$  are assumed to be the *columns*: `\Sexpr{mat <- matrix(c(1, 2, 3, 4, 5, 17, 10, 12, 11, 10), ncol=2, byrow=F); sparkline(mat, rectangle=c(10,16), startdotcolor='blue')}` . You can also try a data frame. Here is the famous *cars* data set: `\Sexpr{sparkline(yspikes=cars, width=20)}` . This plot shows stopping distance vs. speed; to reverse the axis do just `\Sexpr{sparkline(yspikes=cars[,c(2,1)], width=20)}` .

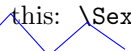
If you have just one vector, it is assumed to be the  $y$  coordinates, and the  $x$  coordinates are 1, 2, ...: `\Sexpr{sparkline(c(1,8,-5,10), startdotcolor='green', bottomline=TRUE)}` .


If you have a time series, it will be recognized as well: here are the measurements of the annual flow of the river Nile at Aswan (formerly 'Assuan'), 1871-1970: `\Sexpr{sparkline(Nile, width=30)}` .

The parameter `na.rm` selects whether to remove the NA values and connect the data over them: compare `\Sexpr{sparkline(c(3,5,4,NA,12,9), na.rm=TRUE)}` , and the similar command with `na.rm` set to `FALSE`: `\Sexpr{sparkline(c(3,5,4,NA,12,9), na.rm=FALSE)}` .


### 3 Scaling and clipping

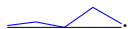
When producing several sparklines, one may want to make them comparable. This means that their  $x$  or  $y$  ranges better be the same. The options `xlim` and `ylim` can be used to set them. Note that each of these options has the form `c(min, max)`; if either limit is `NA`, the value is taken from the data. Compare, for example, `\Sexpr{sparkline(c(2,4,8,12,16))}` , `\Sexpr{sparkline(c(2,4,8,12,16), ylim=c(NA,20))}` , and `\Sexpr{sparkline(c(2,4,8,12,16), ylim=c(-10,20))}` .

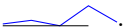
Note that `xlim` and `ylim` just change the scaling of the data, mapping it to the range of the the sparkline area. This means that data outside `xlim` or `ylim` is still plotted, but will overlay the text around like this: `\Sexpr{sparkline(c(2,20,1,16,4), ylim=c(NA,10), xlim=c(2,5))}` . Starting with the version v1.7 the  $\LaTeX$  *sparklines* package provides the option of clipping. You can use it setting `clip` to `TRUE`, either in the command itself, or globally with `options(ltxsparklines.clip=TRUE)`. This produces the following result: `\Sexpr{sparkline(c(2,20,1,16,4),`

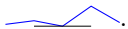
`\ylim=c(NA,10), xlim=c(2,5), clip=TRUE)}` . Note that clipping is done in L<sup>A</sup>T<sub>E</sub>X rather than in *R*, so the closeness of the clipping is define by the L<sup>A</sup>T<sub>E</sub>X length `\sparklineclipsep`.

## 4 Additional features

Sometimes you may want to draw a horizontal rectangle showing, for example, interquartile range or 95% interval for the data. The argument `rectangle=c(min, max)` can be used for this: `\Sexpr{sparkline(Nile, rectangle=quantile(Nile, c(0.025, 0.975)), width=30)}` .

You can show the *x* axis with the argument `bottomline=TRUE`: `\Sexpr{sparkline(c(2,4,1,12,3), bottomline=TRUE)}` . You need L<sup>A</sup>T<sub>E</sub>X *sparklines* package of version 1.6 or later for this feature.

The argument `bottomlinelength` gives the length of the bottom line (in data coordinates) (by default, the line is drawn across the full rectangle): `\Sexpr{sparkline(c(2,4,1,12,3), bottomline=TRUE, bottomlinelength=4)}` .

Starting with version 1.7 of the L<sup>A</sup>T<sub>E</sub>X *sparklines* package there is an alternative mechanism for extensible bottom lines. The argument `bottomlinex`, accordingly, has two arguments, with the start and the end of a bottom line. If both are not NA, the bottom line will be drawn: `\Sexpr{sparkline(c(2,4,1,12,3), bottomlinex=c(2,4))}` .

## 5 A more complex example

The Nile data in the previous section show a very long graph. It is interesting to look how did the flow change from a decade to decade. To do this we will make a table with decades in one column and sparklines in another. To compare the data, we will use the same vertical limits and plot a rectangle showing the span between 25% and 75% of the total data (the interquartile range). The table is completely constructed in an *R* chunk.

There are differences between the ways such chunks are constructed in *Sweave* and *knitr*: the former uses `<<results=tex>>` chevron, while the latter uses `<<results='asis'>>` chevron. You may use the same chevron if you define `tex <- 'asis'`, but *knitr* will still issue warnings. In both cases you need to set the output to '*knitr*' to get the correct output.

The construction is rather involved, so we do it step by step.

We create the vector `decadeStarts` with first year of the decade, and store the range and interquartile range of the total:











```
> decadeStarts <- seq(min(time(Nile)), max(time(Nile)),
+                     by=10)
> rangeNile <- range(Nile)
> iqrNile <- quantile(Nile, c(0.25, 0.75))
```

The function `printDecade` outputs a line like 1871--1880 & SPARKLINE\:

```
> printDecade <- function (start) {
+   end <- start+9
+   paste0(start, "--", end, " & ",
+         sparkline(window(Nile, start, end),
+                   width=20,
+                   xlim=c(start, end),
+                   ylim=rangeNile,
+                   rectangle=iqrNile,
+                   output='knitr'),
+         "\\\")
+ }
```

Now we can print the table

```
> # Table header
> result <- paste("\\begin{tabular}{ll}",
+               "\\toprule",
+               "Decade & Annual flow\\\\",
+               "\\midrule",
+               sep="\n")
> # Table body
> result <- paste(result,
+               paste(sapply(decadeStarts, printDecade),
+                     collapse="\n"),
+               sep="\n")
> # Table footer
> result <- paste(result,
+               "\\bottomrule",
+               "\\end{tabular}",
+               sep="\n")
> # Printing table
> cat(result)
```

Decade	Annual flow
1871–1880	
1881–1890	
1891–1900	
1901–1910	
1911–1920	
1921–1930	
1931–1940	
1941–1950	
1951–1960	
1961–1970	

## References

Andreas Löffler and Dan Luecking. *Sparklines*, December 2016. URL <http://www.ctan.org/pkg/sparklines>.

## A $\LaTeX$ package versions

The package uses  $\LaTeX$  *sparklines* Löffler and Luecking [2016] for processing. You need a relatively new version of this package for all features to work. If you cannot upgrade your  $\LaTeX$  system, try downloading the style file from the package URL and putting it in the working directory.

Below is a quick summary of the *sparklines* versions:

Version	Date	Features
1.5	November 21, 2009	Probably the oldest version that can be expected to work with <i>ltxsparklines</i> (but is <i>not</i> guaranteed to work!).
1.6	October 19, 2014	Support for <code>bottomline</code> .
1.7	December 26, 2016	Support for clipping, <code>bottomlinex</code> , bug fixes. This is the supported version.