

Using RMarkdown for reproducible and neat documents

Your name here
Your affiliation here

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```
Date: !r Sys.Date()
R version: !r getRversion()
*Corresponding author: Your email here
```

Overview

This document showcases how to create and use RMarkdown documents.

You can easily create headings. This is a first order heading.

Then move down in heading order size

Like this subheading

And this fourth order heading

You can write in **bold** and *italicised* text (in **two** different *ways*).

You can write in-line `code` if you want to differentiate between when you are typing normally or highlighting `model parameters`, for example.

Equations like this $t' = \gamma(t - vx/c^2)$, to appear within text lines.

Create links to your website.

Make footnotes¹.

Insert line breaks between text like this, which works best in large slabs of text

Insert a horizontal line break using five asterisks (‘*****’)

The raw Rmd file also has the code for inserting user comments.

(There is also a page break here. Best seen in PDF. Check the raw Rmd file to see the code)

¹Here is the footnote you created earlier, automatically formatted

Define equations

Accordingly, we write the eigenfunction of a spinless particle as the superposition of plane wave states of momentum (π) and energy (E_j) having amplitudes $a(\pi, E_j)$ (from [1]).

$$\phi n(r, t) = \sum_{i,j} a(p_i, E_j) e^{\frac{i}{\hbar}(p_i \cdot r - E_j t)}$$

Create, alter, and embed plots

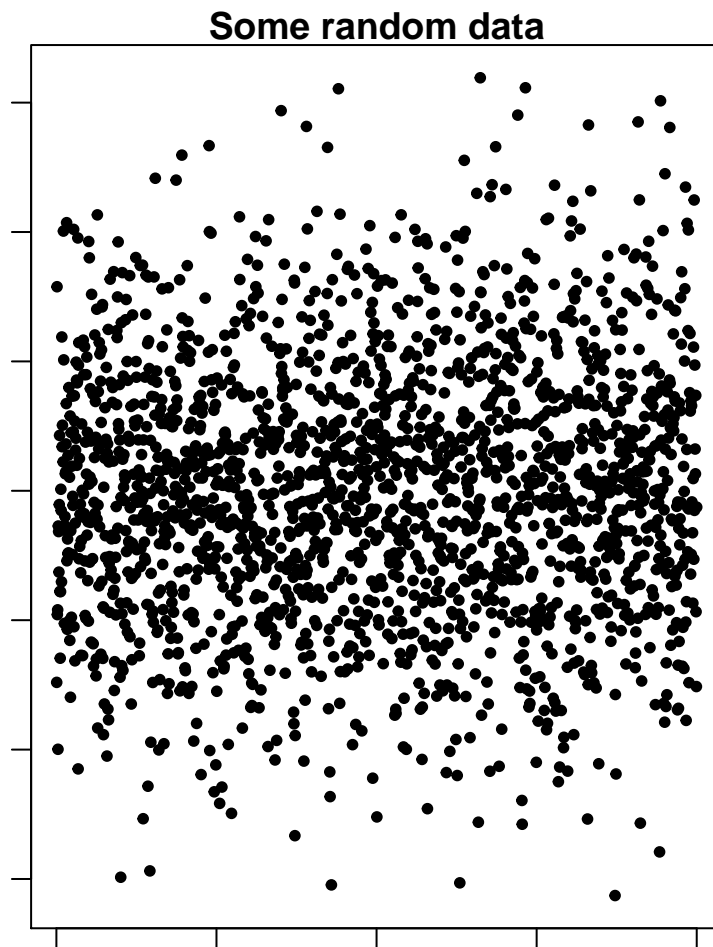
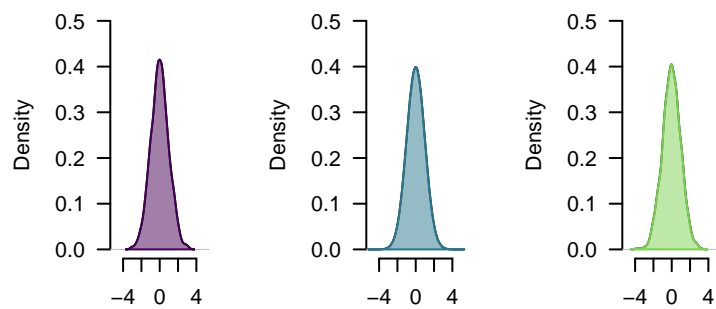
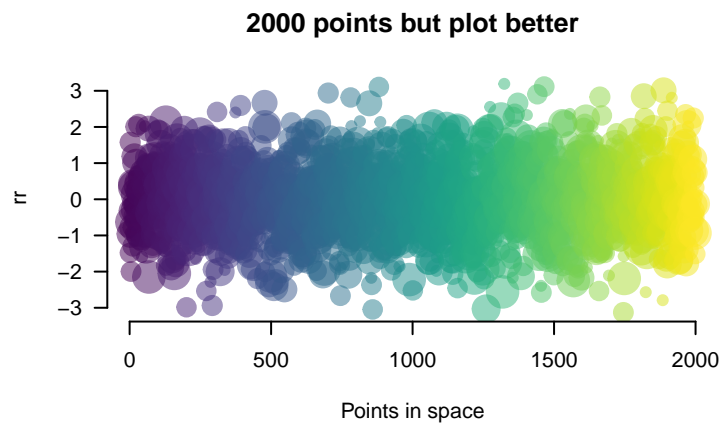


Figure 1. Example of a stock plot embedded into a PDF from RMarkdown.

Show plots with associated code

```
suppressWarnings(require(viridis))
bm <- 1
par(las=1,bty="n"); xlim <- c(-5,5);ylim <- c(0,0.5)
set.seed(12)
N <- 2000
rr <- rnorm(N); rr2 <- rnorm(N^2); rr3 <- rnorm(N+0.3)
rrd <- density(rr);rrd2 <- density(rr2);rrd3 <- density(rr3)
main <- paste0(N," points but plot better");xlab <- "Points in space"
if(bm==1){
  layout(matrix(c(rep(1,3),2:4), 2, 3, byrow = TRUE));sc <- 1
  plot(rr,las=1,bty="n",col=adjustcolor(viridis(N),0.5),pch=20,cex=runif(10,1,5),
        main=main,xlab=xlab)
  for(r in list(rrd,rrd2,rrd3)){
    plot(r,xlim=xlim,ylim=ylim,main="")
    polygon(r,col=adjustcolor(viridis(250)[sc],0.5),border=viridis(250)[sc]);sc <- sc+100}
}else{par(mfrow=c(1,1))
  plot(rr,las=1,bty="n",col=adjustcolor(viridis(N),0.5),pch=20,cex=runif(10,1,5),
        main=main,xlab=xlab)}
```



`N = 2000 Bandwidth = 0.1 = 4000000 Bandwidth = 0 N = 2000 Bandwidth = 0.1`

Figure 2. Example of a plot with improved graphics and its associated code embedded into the output document from RMarkdown.

And tables

Table 1. Definitions of model parameters for individual hosts and **parasites**. Dimensions and units: -, dimensionless; cm, centimetres; J, Joules; L, length.

| Parameter | Definition | Dimension(unit) |
|-----------|-------------------------------|----------------------|
| L | structural length | cm |
| ee | scaled reserve density | J (cm ³) |
| D | host development | — |
| RH | energy in reproduction buffer | J |

Use buttons or tabs for sub-chapters

Chapter 1

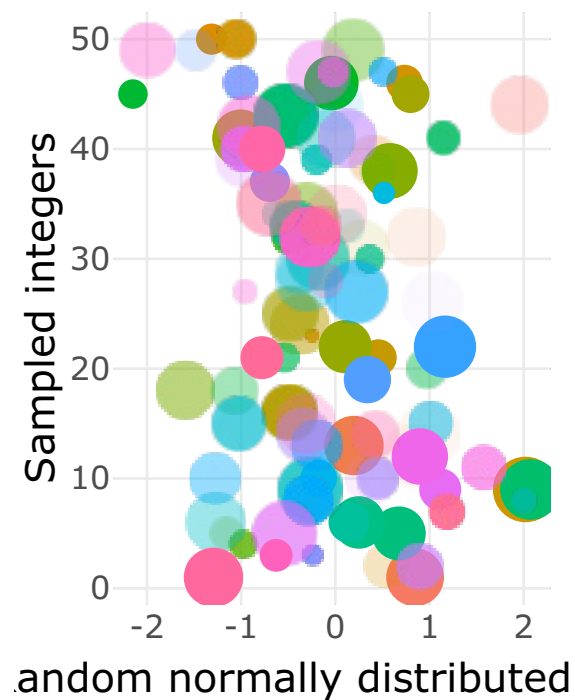
.....

Then you can add whatever you want here like you would normally write in the `Rmd` file.

.....

Chapter 2 (with new code)

Here's an Easter egg for you ...



More tables

Here's a new way of creating tables using the `DT` package

Show entries Search:

Table 1. The 'mtcars' dataset presented in a datatable. Try editing the columns and cells.

| | mpg | cyl | dis | hp | drat | wt | qsec | vs | am | gear | carb |
|-------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| | <input type="text" value="All"/> | <input type="text" value="All"/> | <input type="text" value="All"/> | <input type="text" value="All"/> | <input type="text" value="All"/> | <input type="text" value="All"/> | <input type="text" value="All"/> | <input type="text" value="All"/> | <input type="text" value="All"/> | <input type="text" value="All"/> | <input type="text" value="All"/> |
| Mazda RX4 | 21 | 6 | 160 | 110 | 3.9 | 2.62 | 16.46 | 0 | 1 | 4 | 4 |
| Mazda RX4 Wag | 21 | 6 | 160 | 110 | 3.9 | 2.875 | 17.02 | 0 | 1 | 4 | 4 |
| Datsun 710 | 22.8 | 4 | 108 | 93 | 3.85 | 2.32 | 18.61 | 1 | 1 | 4 | 1 |
| Hornet 4 Drive | 21.4 | 6 | 258 | 110 | 3.08 | 3.215 | 19.44 | 1 | 0 | 3 | 1 |
| Hornet Sportabout | 18.7 | 8 | 360 | 175 | 3.15 | 3.44 | 17.02 | 0 | 0 | 3 | 2 |

Showing 1 to 5 of 32 entries Previous 2 3 4 5 6 7 Next

Embed code from different languages

This is R code

```
pck <- 0
if(pck==1){
  p<-c("rJava", "RNetLogo"); remove.packages(p)
  # then install rJava and RNetLogo from source
  install.packages("rJava", repos = "https://cran.r-project.org/")
  install.packages("RNetLogo", repos = "https://cran.r-project.org/")
}
```

shell/bash

```
echo "Hello Bash!"
pwd # check working dir
git init # initialise git
```

Octave (and MATLAB from the RMatlab package).

RMatlab documentation.

```
b = [4; 9; 2] # Column vector
A = [ 3 4 5;
      1 3 1;
      3 5 9 ]
x = A \ b     # Solve the system Ax = b
```

HTML

```
<!-- links-->
    <div class="footer">
        <a href="dd_feed.html"
            class="transition fade_in">
            Latest post
        </a>
        &nbsp; &nbsp; &nbsp; &nbsp;
        <a href="dd_contact.html"
            class="transition fade_in">
            Contact
        </a>
        &nbsp; &nbsp; &nbsp; &nbsp;
        <a href="dd_subscribe.html"
            class="transition fade_in">
            Subscribe
        </a>
    </div>
```

CSS

```
# custom code for the tabs in this file
.btn {
    border-width: 0 0px 0px 0px;
    font-weight: normal;
    text-transform: ;
}
.btn-default {
    color: #f08080;
    background-color: #ffffff;
    border-color: #ffffff;
}
```

Javascript to access html and css

```
$('.title').css('color', 'red')
```

Python

```
x = 'hello, python world!'
print(x.split(' '))
```

Here's a complete list of available languages

```
names(knitr::knit_engines$get())
```

```
## [1] "awk"      "bash"      "coffee"    "gawk"      "groovy"    "haskell"   "lein"
## [9] "node"     "octave"    "perl"      "psql"      "Rscript"   "ruby"      "sas"
## [17] "sed"      "sh"        "stata"     "zsh"       "highlight" "Rcpp"      "tikz"
## [25] "c"        "fortran"   "fortran95" "asy"       "cat"       "asis"      "stan"
## [33] "block2"   "js"        "css"       "sql"       "go"        "python"    "julia"
## [41] "scss"
```

References

[1] Efthimiades, S., Physical meaning and derivation of Schrodinger and Dirac equations, Department of Natural Sciences, Fordham University, doi: d34464566.