

# Sinusoid

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## Sinusoid

The utility `sinusoid` can generate a sinusoid of a specified frequency, amplitude and phase shift.

```
sinusoid outputfilename <freq> <amplitude> <phase>
```

```
../../sinusoid/bin/sinusoid sine_4_1.5.csv 4 1.5
```

The above command generated a sinusoid of frequency=4 and amplitude 1.5. The output is in the form of a csv file. Now let us load and analyze the data.

```
../../sinusoid/bin/sinusoid sine_2_1_1.csv 2 1 1
```

Another sinusoid - freq=2 amplitude=1 phase=1

## Setup the environment

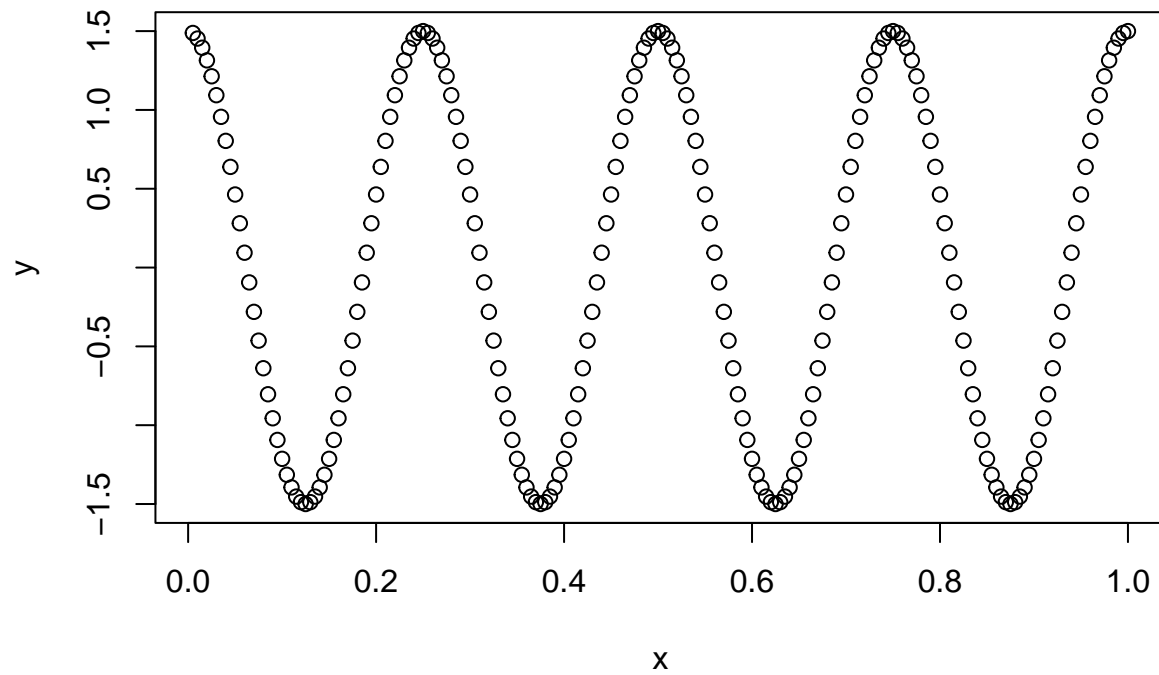
```
library(dplyr)
```

```
##  
## Attaching package: 'dplyr'  
  
## The following objects are masked from 'package:stats':  
##  
##   filter, lag  
  
## The following objects are masked from 'package:base':  
##  
##   intersect, setdiff, setequal, union
```

```
library(ggplot2)
```

Load the table of values and plot

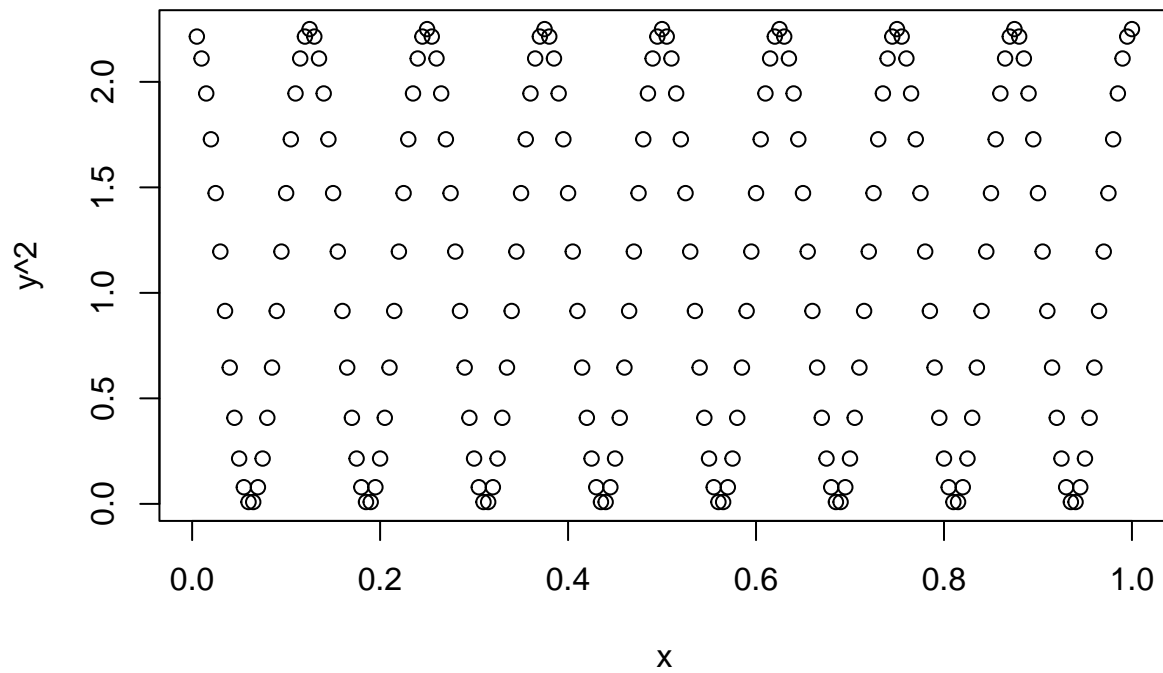
```
values_4_15<-read.csv("sine_4_1.5.csv")  
names(values_4_15)<-c("x","y")  
plot(values_4_15$x,values_4_15$y,xlab="x",ylab="y")
```



## Plot the square of the value

Let us create a column with the square of the value and plot that.

```
values_4_15 <- values_4_15 %>% mutate(ysq=y^2)  
plot(values_4_15$x, values_4_15$ysq, xlab="x", ylab="y^2")
```



## Some signal algebra

```
values_2_1_1<-read.csv("sine_2_1_1.csv")
names(values_2_1_1)<-c("x","y")
values_4_15<-cbind(values_4_15,y_2=values_2_1_1$y)
values_4_15<- values_4_15 %>% mutate(y_sum=ysq+y_2)
plot(values_4_15$x,xlab="x",values_4_15$y_sum,ylab="y_sum")
```

