

Barplot

`barplot()` where height is vector or matrix

Options: `horiz=TRUE`, `main`, `xlab`, `ylab`, `names.arg`

If height is matrix, stacked and grouped bar plot is produced

Options: `beside=TRUE`, `col`, `legend`

If height is factor or ordered factor, use `plot()` function

Spinograms

`spine()` function in `vcd` package

Pie charts

```
par(mfrow=c(2, 2))
slices <- c(10, 12.4, 16, 8)
lbls <- c("US", "UK", "Australia", "Germany", "France")

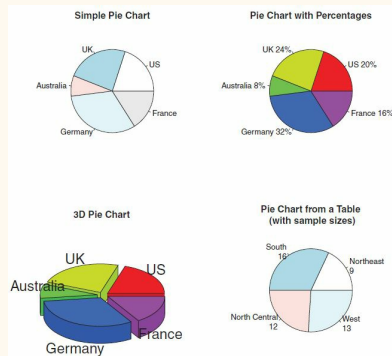
pie(slices, labels = lbls,
    main="Simple Pie Chart")
# 1 Combine four graphs into one

pct <- round(slices/sum(slices)*100)
lbls2 <- paste(lbls, " ", pct, "%", sep="")
pie(slices, labels=lbls2, col=rainbow(length(lbls2)),
    main="Pie Chart with Percentages")
# 2 Add percentages to pie chart

library(plotrix)
pie3D(slices, labels=lbls, explode=0.1,
    main="3D Pie Chart")
# 3 Create chart from table

mytable <- table(states.region)
lbls3 <- paste(names(mytable), "\n", mytable, sep="")
pie(mytable, labels = lbls3,
    main="Pie Chart from a Table\n (with sample sizes)")
# 4
```

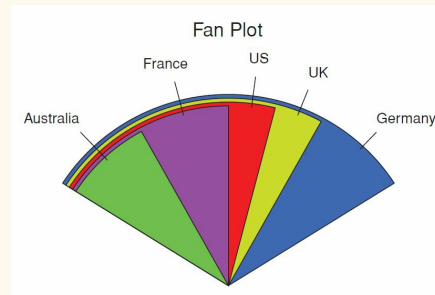
Pie charts



Fan plot

`fan.plot()` in `plotrix` package

Fan plot



Histogram

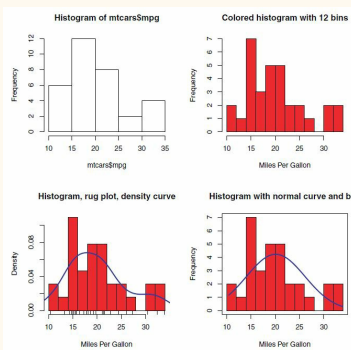
```
par(mfrow=c(2,2))
hist(mtcars$mpg)
# 1 Simple histogram

hist(mtcars$mpg,
    breaks=12,
    col="red",
    xlab="Miles Per Gallon",
    main="Colored histogram with 12 bins")
# 2 With specified bins and color

hist(mtcars$mpg,
    freq=F, las=1,
    breaks=12,
    col="red",
    xlab="Miles Per Gallon",
    main="Histogram, rug plot, density curve")
rug(plot(mtcars$mpg))
lines(density(mtcars$mpg), col="blue", lwd=2)
# 3 With rug plot and frame

x <- mtcars$mpg
be=hist(x,
    breaks=12,
    col="red",
    xlab="Miles Per Gallon",
    main="Histogram with normal curve and box")
xfit<-seq(min(x), max(x), length=40)
yfit<-dnorm(xfit, mean=mean(x), sd=sd(x))
yfit <- yfit*diff(h$midas[1:2])^length(x)
lines(xfit, yfit, col="blue", lwd=2)
box()
# 4 With normal curve
```

Histogram

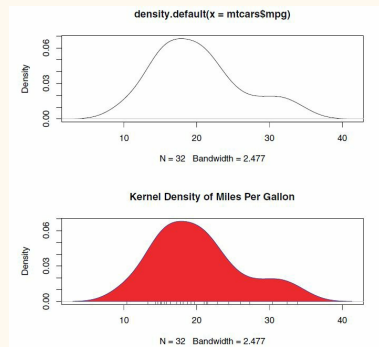


Kernel density plot

```
par(mfrow=c(2,1))
d <- density(mtcars$mpg)
plot(d)

d <- density(mtcars$mpg)
plot(d, main="Kernel Density of Miles Per Gallon")
polygon(d, col="red", border="blue")
rug(mtcars$mpg, col="brown")
```

Kernel density plot



Kernel density plot

```
par(lwd=2)
library(sm)
attach(mtcars)

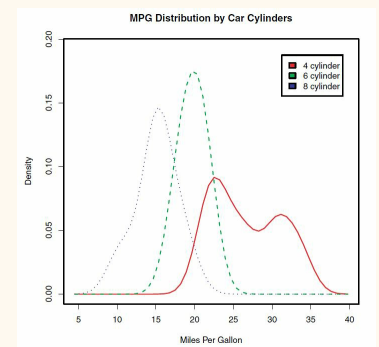
cyl.f <- factor(cyl, levels = c(4,6,8),
    labels = c("4 cylinder", "6 cylinder", "8 cylinder"))
# 1 Double width of plotted lines

sm.density.compare(mpg, cyl, xlab="Miles Per Gallon")
title(main="MPG Distribution by Car Cylinders")
# 2 Create grouping factor

colfill <- (2:(1+length(levels(cyl.f))))
legend(locator(1), levels(cyl.f), fill=colfill)
# 3 Plot densities
# 4 Add legend via mouse click

detach(mtcars)
```

Kernel density plot



Box plots

Five-number summary

Minimum, lower quartile (25th percentile), median (50th percentile), upper quartile (75th percentile), maximum

Outliers

Values outside the range of $\pm 1.5 \cdot IQR$

Example

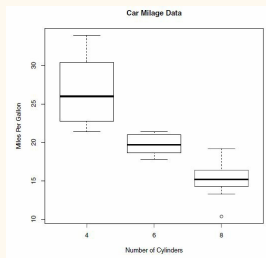
```
boxplot(mtcars$mpg,
        main="Box plot", ylab="Miles per Gallon")
```

```
boxplot.stats(mtcars$mpg)
```

Parallel box plots for comparison

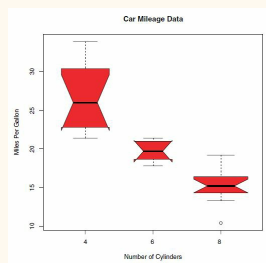
```
boxplot(formula, data=data.frame)
```

Box plots



```
boxplot(mpg ~ cyl, data=mtcars,
        main="Car Mileage Data",
        xlab="Number of Cylinders",
        ylab="Miles per Gallon")
```

Box plots



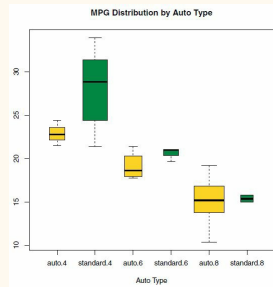
```
boxplot(mpg ~ cyl, data=mtcars,
        notch=TRUE, varwidth=TRUE,
        col="red", main="Car Mileage Data",
        xlab="Number of Cylinders",
        ylab="Miles per Gallon")
```

Box plots (2 crossed factors)

```
mtcars$cyl.f <- factor(mtcars$cyl,
                      levels=c(4,6,8),
                      labels=c("4", "6", "8"))
mtcars$am.f <- factor(mtcars$am,
                     levels=c(0,1),
                     labels=c("auto", "standard"))
boxplot(mpg ~ am.f * cyl.f,
        data=mtcars,
        varwidth=TRUE,
        col=c("red", "darkgreen"),
        main="MPG Distribution by Auto Type",
        xlab="Auto Type")
```

← Create factor for # of cylinders
← Create factor for transmission type
← Generate box plot

Box plots (2 crossed factors)

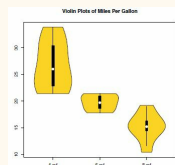


Violin plots

Violin plots are kernel density plots superimposed in a mirror image fashion over box plots

```
vioplot(x1, x2, ..., names=,
        col=)
```

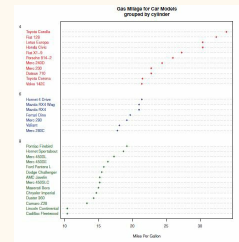
Violin plots



```
library(vioplot)
x1 <- mtcars$mpg[mtcars$cyl==4]
x2 <- mtcars$mpg[mtcars$cyl==6]
x3 <- mtcars$mpg[mtcars$cyl==8]
vioplot(x1, x2, x3, names=c("4 cyl", "6 cyl", "8 cyl"),
        col="gold")
title("Violin Plots of Miles Per Gallon")
```

Dot plots

Dot plots - grouped, sorted and colored



```
x <- mtcars[order(mtcars$mpg),]
x$cyl <- factor(x$cyl)
x$color[x$cyl==4] <- "red"
x$color[x$cyl==6] <- "blue"
x$color[x$cyl==8] <- "darkgreen"
dotchart(x$mpg, labels=row.names(x),
         cex=.7, groups=x$cyl,
         gcolor="black", color=x$color,
         pch=19, main="Gas Mileage for Car Models \ngrouped by cylinder",
         xlab="Miles Per Gallon")
```

