Advanced graphics in R

Plots and devices

Arni Magnusson

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Outline

1. Plot types - 1d, 2d, multivariate, special
2. Detail control - multipanel, colors, parameters, legend, plotmath
3. Trellis plots - overview, formula, detail control, panel functions
4. Devices and files - screen, postscript, ps/eps/pdf, png/tiff/jpeg

Outline

Numeric vector

```
barplot(islands[islands>1000])
```

```
hist(precip)
```

```
densityplot(precip)
```

```
boxplot(precip)
```

Numeric vector by factor(s)

```
dotplot(variety ~ yield|site, data=barley,
        groups=year, layout=c(1,6), pch=16,
        col=1:2)
```

```
boxplot(2.54*height ~ voice.part, data=singer)
```

```
bwplot(len ~ 1|factor(dose)+supp,
       data=ToothGrowth, horiz=FALSE,
       as.table=TRUE)
```

Scatterplot and line plot

```
plot(dist ~ speed, data=cars, pch=16)
lofit <- loess(dist ~ speed, data=cars)$fit
lines(cars$speed, lofit, lwd=4, col="red")
```

```
matplot(VADeaths, type="l", lty=1, lwd=4,
        xaxt="n")
axis(1, 1:5, rownames(VADeaths))
legend("topleft", colnames(VADeaths), lwd=4,
       col=1:4, bty="n")
```

Scatterplot by factor

```
coplot(len ~ log(dose)|supp, data=ToothGrowth,
       panel=panel.smooth)
```

```
panel.lmfit <- function(...)
{
  panel.xyplot(...)
  panel.lmline(...)
}
xyplot(len ~ log(dose)|supp, data=ToothGrowth,
       panel=panel.lmfit)
```

Error bars

```
m <- aggregate(Ozone ~ Month, data=airquality,
               mean)[[2]]
se <- aggregate(Ozone ~ Month, data=airquality,
                function(x)
                sd(x)/sqrt(length(x)))[[2]]
plotCI(5:9, m, se, ylim=c(0,75), pch=16, gap=0,
       cex=2, xlab="", ylab="Ozone (ppb)",
       xaxt="n")
axis(1, at=5:9, labels=month.abb[5:9])
```

Bubble plot and 3D scatter

```
plot(Year ~ Age, data=x.cod$N,
     cex=sqrt(x.cod$N$N)/300, pch=16,
     ylim=c(2004,1971), las=1, ylab="")


with(mtcars, plot3d(disp,carb,mpg))
```

Overview and effects

```
datadensity(mtcars)
```

```
plot.design(mpg ~ factor(cyl)+factor(vs)
                +factor(am)+factor(gear)
                +factor(carb), data=mtcars)
```

Scatterplot matrix

```
pairs( ~ mpg+disp+hp+drat+wt+qsec , data=mtcars)
```

```
scatterplotMatrix( ~ mpg+disp+hp+drat+wt+qsec ,
                   data=mtcars)
```

```
splom( ~ cbind(mpg,disp,hp,drat,wt,qsec)
       |factor(am), data=mtcars, pscales=0)
```

Correlation plot

```
m <- cor(mtcars)
plotcorr(m)
```

```
col <- rgb(colorRamp(c("red","white","blue"))
           ((sign(m)*abs(zapsmall(m))^4+1)/2),
           max=255)
plotcorr(m, type="lower", col=col)
```

Parallel coordinates

```
parcoord(mtcars[,c("mpg","disp","hp","drat",
         "wt","qsec")])


parallel(~cbind(mpg,disp,hp,drat,wt,qsec)
         |factor(cyl), data=mtcars,
         layout=c(1,3))


plot(hp~disp, data=mtcars)
identify(mtcars$disp, mtcars$hp,
         labels=rownames(mtcars))
```

Stars and faces

```
stars(mtcars, full=F, draw.segments=T,
      key.loc=c(10,1))
```

```
stars(mtcars[,1:7], flip.labels=F, len=0.8,
      cex=0.7, key.loc=c(13,2))
```

```
faces(rev(mtcars))
```

Prepare surface

```
x <- rnorm(1000)
y <- rnorm(1000)
z <- sin(x) + cos(y)

xcoords <- pretty(x, 10)
ycoords <- pretty(y, 10)

model <- loess(z ~ x+y)
grid <- expand.grid(x=xcoords, y=ycoords)
surface.vector <- predict(model, grid)
surface.matrix <- matrix(surface.vector,
                         nrow=length(xcoords))
```

Contour and 3D surface

```
filled.contour(xcoords, ycoords,
               surface.matrix,
               color.palette=colorRampPalette
               (c("white","darkgray")))
```

```
persp(xcoords,ycoords,surface.matrix,theta=45,
      phi=30, expand=0.5, shade=0.5,
      ticktype="detailed")
```

```
persp3d(xcoords, ycoords, surface.vector,
        col="blue")
```

Other plots

Count data

Maps

...

Outline

Multipanel

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Colors

Parameters

Legend

plotmath

Outline

Overview

Formula

Detail control

Panel functions

Outline

Screen device

Postscript device

PS/EPS/PDF

PNG/TIFF/JPEG