

Advanced graphics in R

Plots and devices

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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

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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(displ, 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")])
```

```
parallelplot(~ 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

...

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Multipanel

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Postscript device
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