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R_in_action

4847 days ago by takepwave

```
# ChromeではPDFをimgタグで表示できないので、pngに変換するように変更 2012/06/27
#
# Rのグラフをsageで表示するためのユーティリティ関数
import time
def preGraph(pdfFile):
    filename = DATA+pdfFile
    r.pdf(file='"%s"' %filename)
    return pdfFile

def offGraph():
    r.dev_off()

def postGraph(pdfFile, fac=0.75):
    r.dev_off()
    width = int(640*fac)
    # html(''%(pdfFile, time.time(), width))
    pngFile = convertPdf2Png(pdfFile)
    html(''%(pngFile, time.time(), width))

def getGraph(pdfFile, fac=0.75):
    width = int(640*fac)
    # return ''%(pdfFile, time.time(), width)
    pngFile = convertPdf2Png(pdfFile)
    return ''%(pngFile, time.time(), width)

def convertPdf2Png(pdfFile):
    pngFile = pdfFile.replace(".pdf", ".png")
    result = os.popen("cd %s; convert -density 600 -geometry 1000 %s %s"%(DATA,
pdfFile, pngFile)).read()
    # print result
    return pngFile
```

```
# 変数の受け渡し
# Sage -> R
# すべてのリストの形式に変換されてRに渡される
s_age = r([1,3,5,2,11,9,3,9,12,3]).name('age')
# name関数で名前を指定することで、Rの変数も定義される
print r('age')
# RからSageへの変換は、sageobj関数または_sage_()メソッドを使用
print sageobj(r('age'))
```

```
[1] 1 3 5 2 11 9 3 9 12 3
[1, 3, 5, 2, 11, 9, 3, 9, 12, 3]
```

文字列配列の受け渡しができないことが分かりました。以下のように無理矢理セットしてください。

```
ary = ["a", "b"]
```

```
ss = str(ary)[1:-1]; print ss # リストを文字列に変換して[と]を取り除く
rary = r('c(%s)%ss').name('rary')
print rary # Rに変換した配列
sary = sageobj(rary)
print sary # sageに戻した配列
```

```
'a', 'b'
[1] "a" "b"
['a', 'b']
```

```
# マトリックスの生成も同様に生成後に名前をつけて代入すればよい
m = r.matrix([1, 2, 3, 4], 2, 2, byrow=True).name('m'); m
```

```
      [,1] [,2]
[1,]    1    2
[2,]    3    4
```

```
# rでも同じ変数名が定義される
r('m')
```

```
      [,1] [,2]
[1,]    1    2
[2,]    3    4
```

```
# Rのマトリックス変数をsageの変数に変換する
print type(m)
sm = sageobj(m)
show(sm)
print type(sm)
```

```
<class 'sage.interfaces.r.RElement'>
```

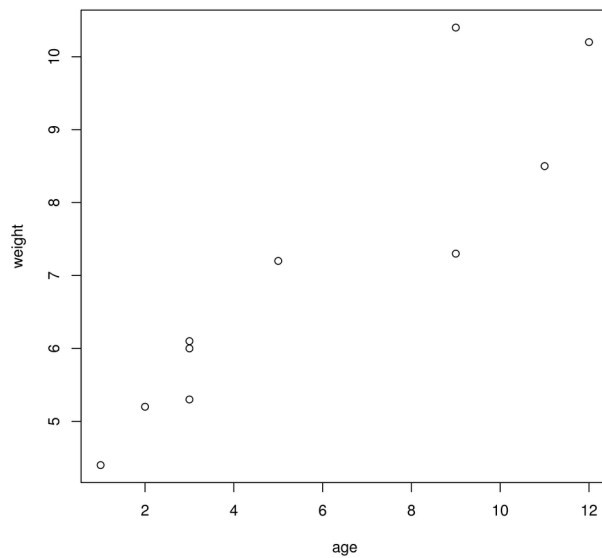
$$\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$$

```
<type 'sage.matrix.matrix_integer_dense.Matrix_integer_dense'>
```

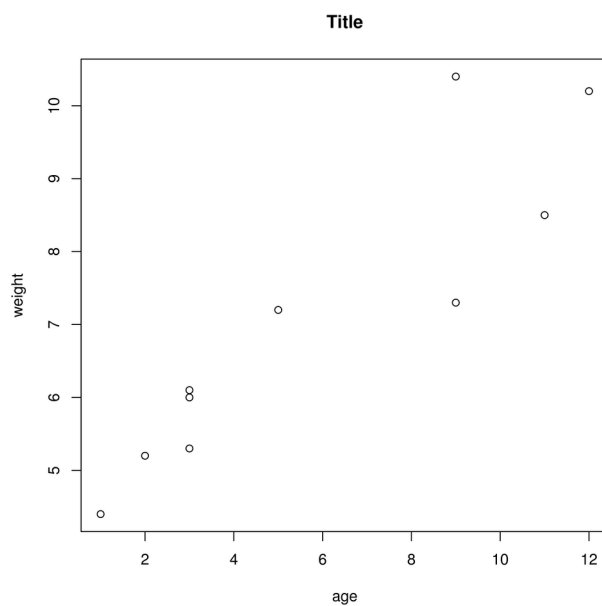
```
# fig1.4
age = r([1,3,5,2,11,9,3,9,12,3]).name('age')
weight = r([4.4,5.3,7.2,5.2,8.5,7.3,6.0,10.4,10.2,6.1]).name('weight')
print r.mean(weight)
print r.sd(weight)
print r.cor(age, weight)
```

```
[1] 7.06
[1] 2.077498
[1] 0.9075655
```

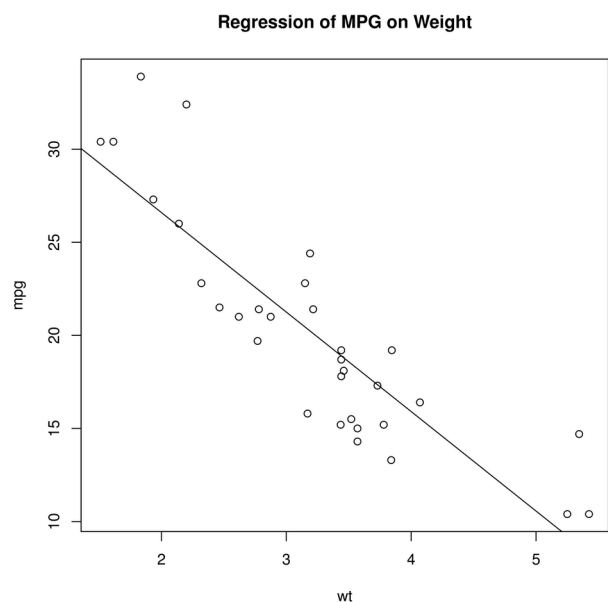
```
# グラフ表示(軸ラベルが正しく表示されていない)
graph = preGraph("fig1.4.pdf")
r.plot(age, weight)
postGraph(graph, fac=0.5)
```



```
# タイトルを追加する場合には、r.plotではなく、r関数を使用する
graph = preGraph("fig1.4withTitle.pdf")
r("plot(age, weight, main='Title')")
postGraph(graph, fac=0.5)
```

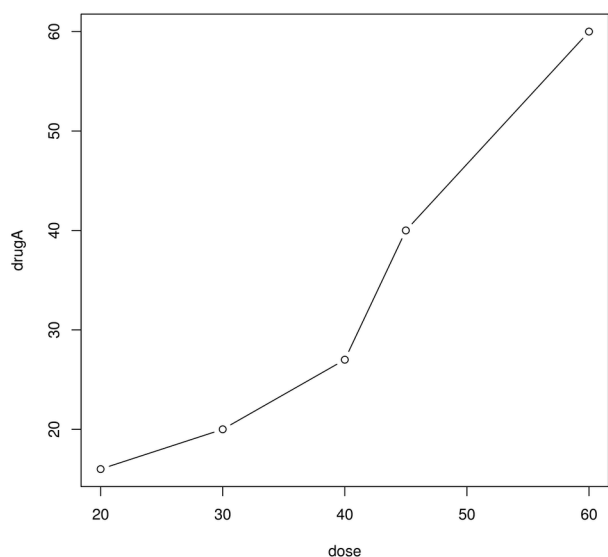


```
# fig 3.1
fig_3_1 = preGraph("fig3.1.pdf")
r('attach(mtcars)')
r('plot(wt, mpg)')
r('abline(lm(mpg~wt))')
r('title("Regression of MPG on Weight")')
r('detach(mtcars)')
postGraph(fig_3_1, fac=0.5)
```

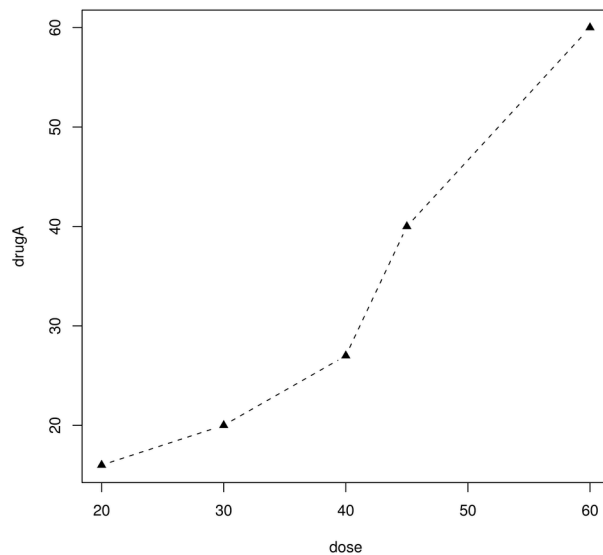


```
# fig 3.2
dose = r.c([20, 30, 40, 45, 60]).name('dose')
drugA = r.c([16, 20, 27, 40, 60]).name('drugA')
drugB = r.c([15, 18, 25, 31, 40]).name('drugB')
```

```
fig_3_2 = preGraph("fig3.2.pdf")
r('plot(dose, drugA, type="b")')
postGraph(fig_3_2, fac=0.5)
```

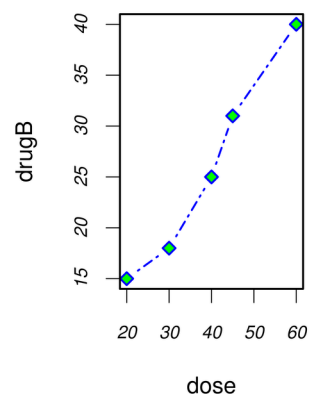
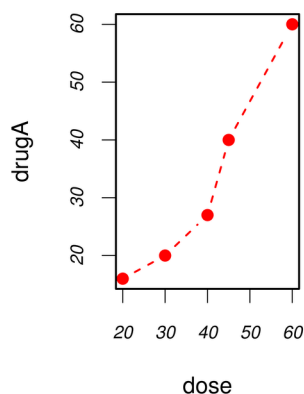


```
# fig 3.3
fig_3_3 = preGraph("fig3.3.pdf")
opar = r('par(no.readonly=TRUE)').name('opar')
r('par(lty=2, pch=17)')
r('plot(dose, drugA, type="b")')
r.par(opar)
postGraph(fig_3_3, fac=0.5)
```

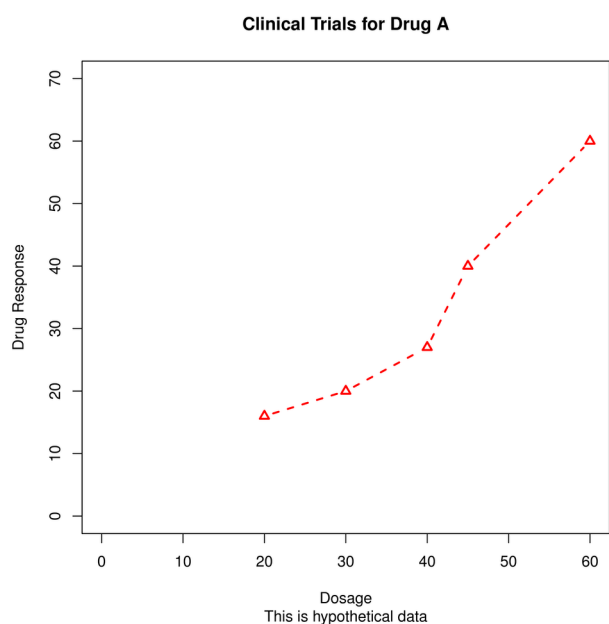


```
# fig 3.7
fig_3_7a = preGraph("fig3.7a.pdf")
r('par(pin=c(2, 3))')
r('par(lwd=2, cex=1.5)')
r('par(cex.axis=.75, font.axis=3)')
r('plot(dose, drugA, type="b", pch=19, lty=2, col="red")')
offGraph()
```

```
# parは、プロット毎にセットしないとダメ
fig_3_7b = preGraph("fig3.7b.pdf")
r('par(pin=c(2, 3))')
r('par(lwd=2, cex=1.5)')
r('par(cex.axis=.75, font.axis=3)')
r('plot(dose, drugB, type="b", pch=23, lty=6, col="blue", bg="green")')
r.par(opar)
offGraph()
html.table([[getGraph(fig_3_7a, fac=0.5), getGraph(fig_3_7b, fac=0.5)]])
```



```
# fig 3.8
fig_3_8 = preGraph("fig3.8.pdf")
r('plot(dose, drugA, type="b", col="red", lty=2, pch=2, lwd=2, main="Clinical Trials
for Drug A", sub="This is hypothetical data", xlab="Dosage", ylab="Drug Response",
xlim=c(0, 60), ylim=c(0, 70))')
postGraph(fig_3_8, fac=0.5)
```

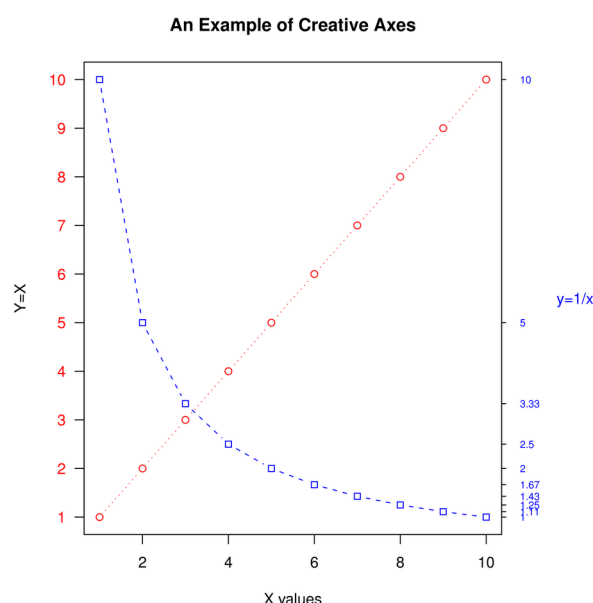


```
# fig 3.9
x = r('c(1:10)').name('x')
y = r('x').name('y')
z = r('10/x').name('z')
print x
print y
print z
```

```
[1] 1 2 3 4 5 6 7 8 9 10
[1] 1 2 3 4 5 6 7 8 9 10
[1] 10.000000 5.000000 3.333333 2.500000 2.000000 1.666667
```

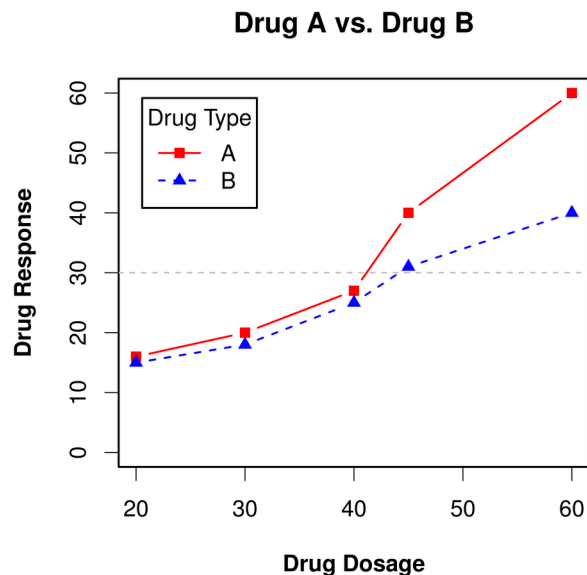
```
1.428571 1.250000 1.111111
[10] 1.000000
```

```
fig_3_9 = preGraph("fig3.9.pdf")
opar = r('par(no.readonly=TRUE)').name('opar')
r('par(mar=c(5, 4, 4, 8) + 0.1)')
r('plot(x, y, type="b", pch=21, col="red", yaxt="n", lty=3, ann=FALSE)')
r('lines(x, z, type="b", pch=22, col="blue", lty=2)')
r('axis(2, at=x, labels=x, col.axis="red", las=2)')
r('axis(4, at=z, labels=round(z, digits=2), col.axis="blue", las=2, cex.axis=0.7,
tck=-.01)')
r('mtext("y=1/x", side=4, line=3, cex.lab=1, las=2, col="blue")')
r('title("An Example of Creative Axes", xlab="X values", ylab="Y=X")')
r.par(opar)
postGraph(fig_3_9, fac=0.5)
```

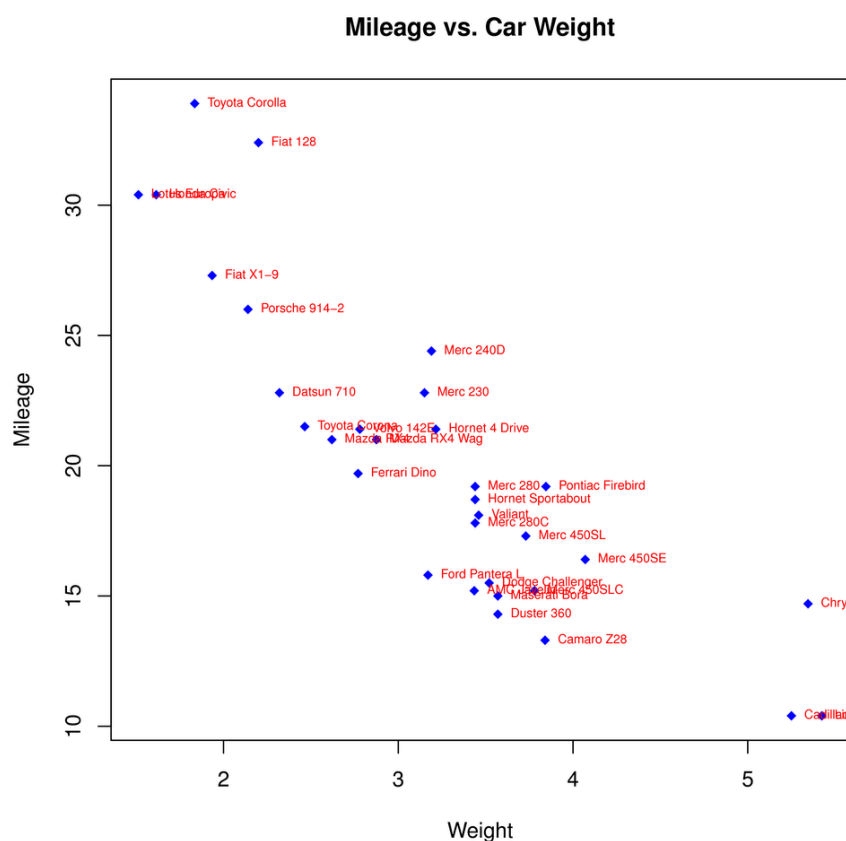


```
# fig3.10
r('library(Hmisc)')

fig_3_10 = preGraph("fig3.10.pdf")
opar = r('par(no.readonly=TRUE)').name('opar')
r('par(lwd=2, cex=1.5, font.lab=2)')
r('plot(dose, drugA, type="b", pch=15, lty=1, col="red", ylim=c(0, 60), main="Drug A
vs. Drug B", xlab="Drug Dosage", ylab="Drug Response")')
r('lines(dose, drugB, type="b", pch=17, lty=2, col="blue")')
r('abline(h=c(30), lwd=1.5, lty=2, col="gray")')
r('minor.tick(nx=3, ny=3, tick.ratio=0.5)')
r('legend("topleft", inset=.05, title="Drug Type", c("A","B"), lty=c(1, 2),
pch=c(15, 17), col=c("red", "blue"))')
r.par(opar)
postGraph(fig_3_10, fac=0.5)
```



```
# fig 3.11
r('attach(mtcars)')
fig_3_11 = preGraph("fig3.11.pdf")
r('plot(wt, mpg, main="Mileage vs. Car Weight", xlab="Weight", ylab="Mileage",
pch=18, col="blue")')
r('text(wt, mpg, row.names(mtcars), cex=0.6, pos=4, col="red")')
postGraph(fig_3_11, fac=0.7)
r('detach(mtcars)')
```



NULL

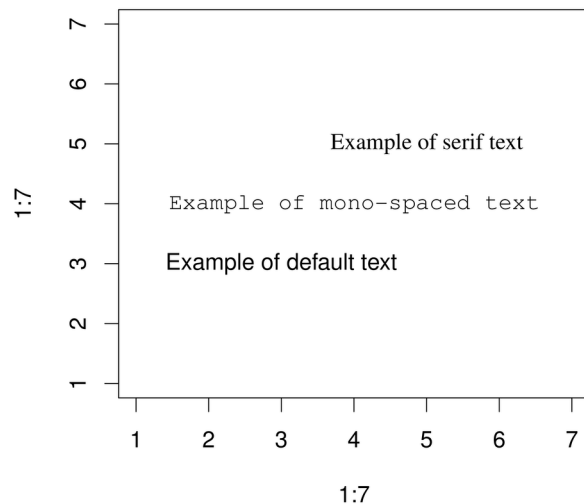
```
# fig 3.12
fig_3_12 = preGraph("fig3.12.pdf")
opar = r('par(no.readonly=TRUE)').name('opar')
r('par(cex=1.5)')
```



```

r('plot(1:7,1:7,type="n")')
r('text(3,3,"Example of default text")')
r('text(4,4,family="mono","Example of mono-spaced text")')
r('text(5,5,family="serif","Example of serif text")')
r.par(opar)
postGraph(fig_3_12, fac=0.5)

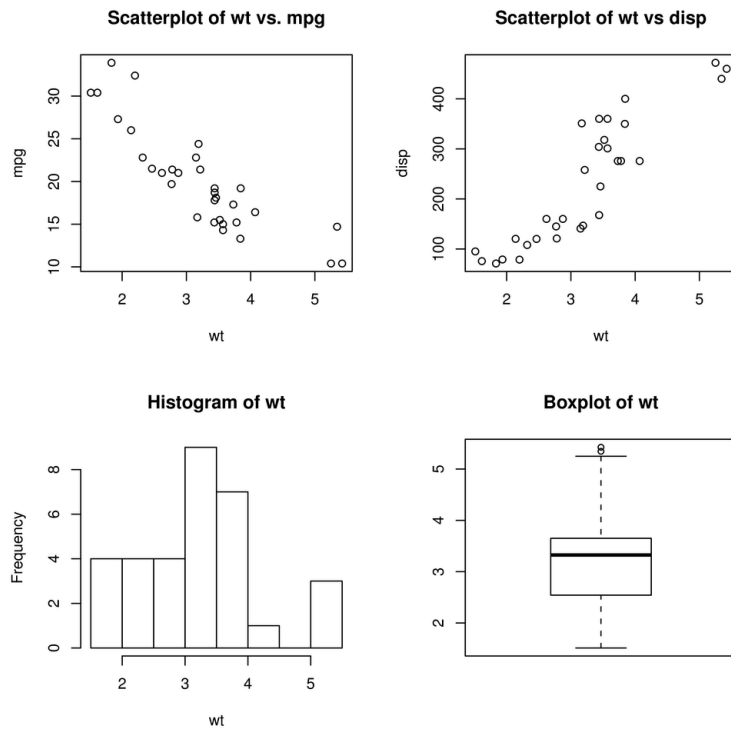
```



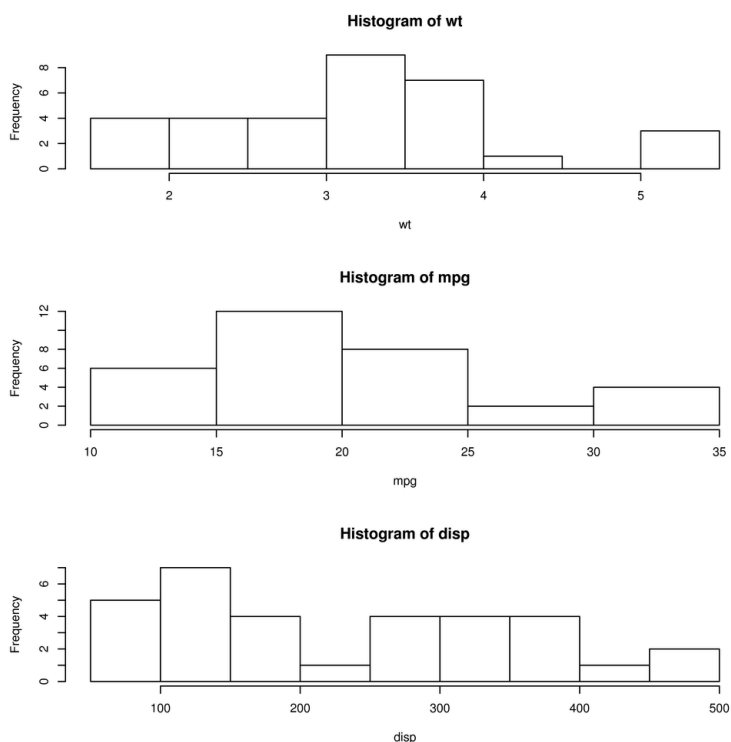
```

# fig 3.14
fig_3_14 = preGraph("fig3.14.pdf")
r('attach(mtcars)')
opar = r('par(no.readonly=TRUE)').name('opar')
r('par(mfrow=c(2,2))')
r('plot(wt,mpg, main="Scatterplot of wt vs. mpg")')
r('plot(wt,disp, main="Scatterplot of wt vs disp")')
r('hist(wt, main="Histogram of wt")')
r('boxplot(wt, main="Boxplot of wt")')
r.par(opar)
r('detach(mtcars)')
postGraph(fig_3_14, fac=0.6)

```



```
# fig 3.15
fig_3_15 = preGraph("fig3.15.pdf")
r('attach(mtcars)')
opar = r('par(no.readonly=TRUE)').name('opar')
r('par(mfrow=c(3,1))')
r('hist(wt)')
r('hist(mpg)')
r('hist(dis)')
r.par(opar)
r('detach(mtcars)')
postGraph(fig_3_15, fac=0.6)
```

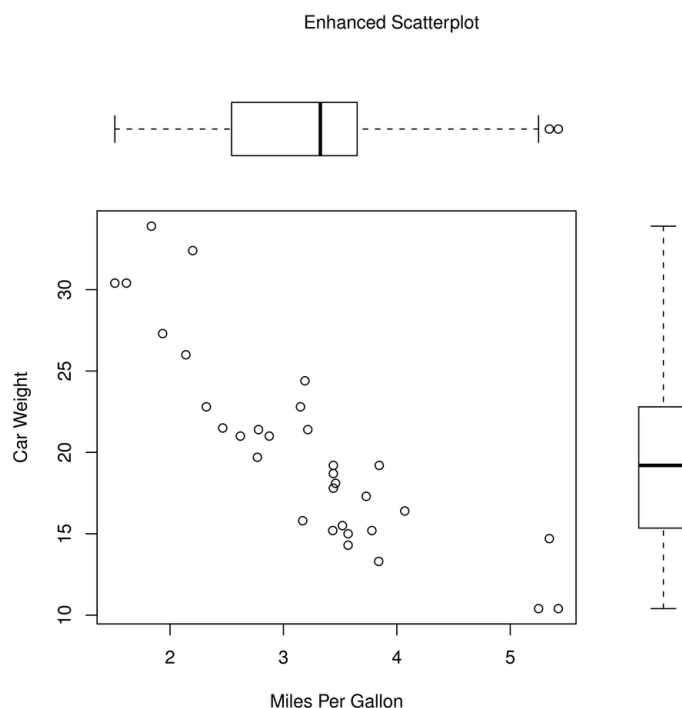


```
# fig 3.18
fig_3_18 = preGraph("fig3.18.pdf")
```

```

opar = r('par(no.readonly=TRUE)').name('opar')
# Set up scatter plot
r('par(fig=c(0, 0.8, 0, 0.8))')
r('plot(mtcars$wt, mtcars$mpg, xlab="Miles Per Gallon", ylab="Car Weight")')
# Add box plot above
r('par(fig=c(0, 0.8, 0.55, 1), new=TRUE)')
r('boxplot(mtcars$wt, horizontal=TRUE, axes=FALSE)')
# Add box plot to right
r('par(fig=c(0.65, 1, 0, 0.8), new=TRUE)')
r('boxplot(mtcars$mpg, axes=FALSE)')
r('mtext("Enhanced Scatterplot", side=3, outer=TRUE, line=-3)')
r.par(opar)
postGraph(fig_3_18, fac=0.6)

```



```

# Sec 6.1.1 Simple bar plots
# vcdパッケージを使用するため、1回のみ実行
# r('install.packages("vcd")')

```

```

r("library(vcd)")

```

```

[1] "vcd"           "colorspace" "grid"        "MASS"        "stats"
"graphics"      "grDevices"
[8] "utils"         "datasets"   "methods"     "base"

```

```

counts = r("table(Arthritis$Improved)").name('counts'); counts

```

```

None    Some Marked
  42     14     28

```

```

# fig 6.1a
fig6_1a = preGraph("fig6.1a.pdf")
r('barplot(counts, main="Simple Bar Plot", xlab="Improvement", ylab="Frequency")')
offGraph()

```

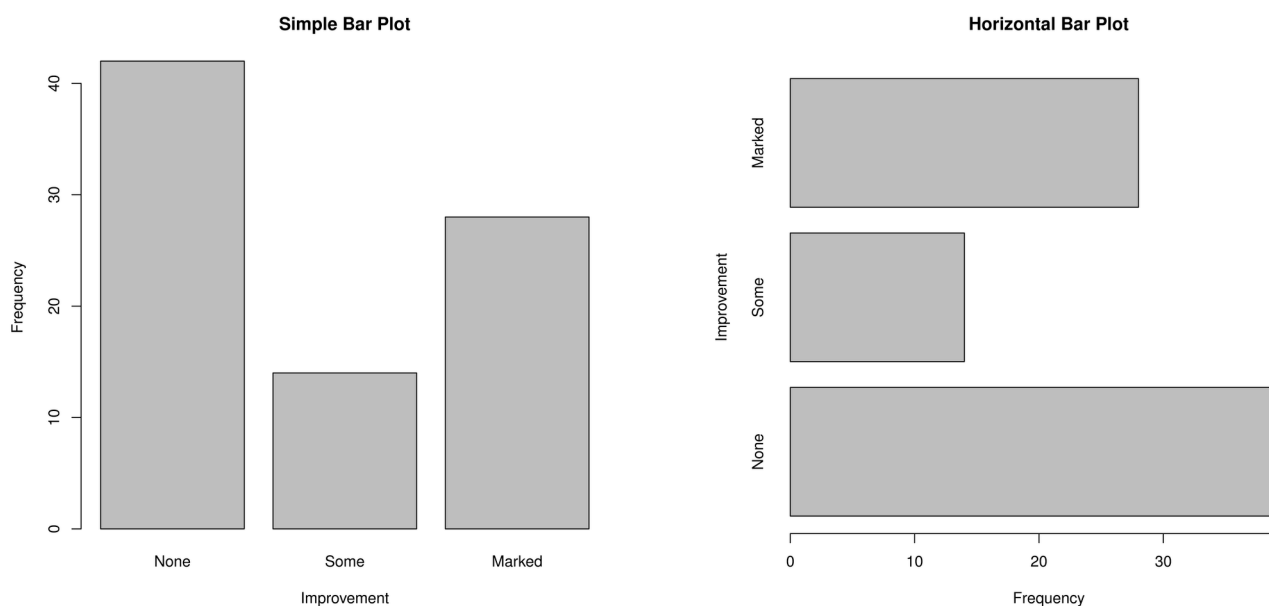
```

# fig 6.1b
fig6_1b = preGraph("fig6.1b.pdf")

```

```
r('barplot(counts, main="Horizontal Bar Plot", xlab="Frequency", ylab="Improvement",
horiz=TRUE)')
offGraph()
```

```
html.table([[getGraph(fig6_1a, fac=0.5), getGraph(fig6_1b, fac=0.5)])]
```

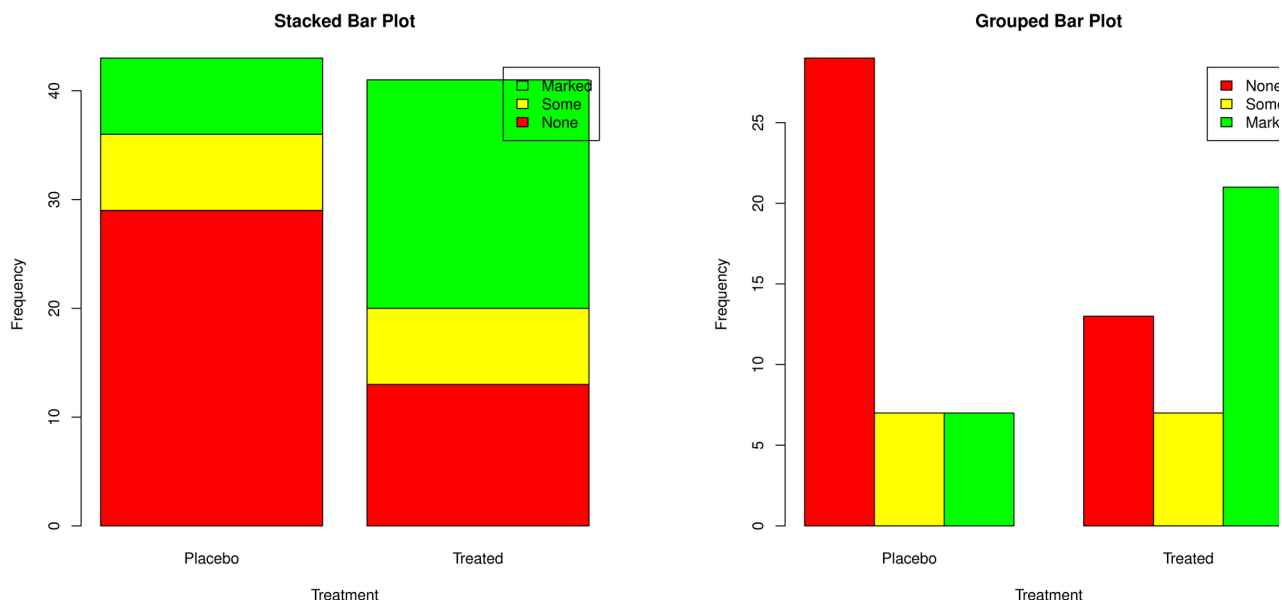


Sec. 6.2

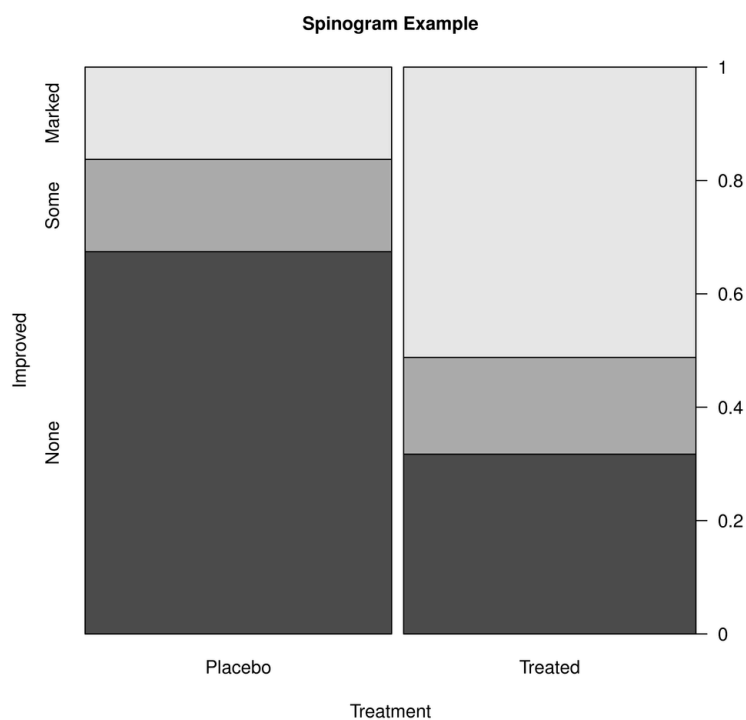
```
counts = r("table(Arthritis$Improved, Arthritis$Treatment)").name('counts'); counts
```

	Placebo	Treated
None	29	13
Some	7	7
Marked	7	21

```
# fig 6.2
fig6_2a = preGraph("fig6.2a.pdf")
r('barplot(counts, main="Stacked Bar Plot", xlab="Treatment", ylab="Frequency",
col=c("red", "yellow", "green"), legend=rownames(counts))')
offGraph()
fig6_2b = preGraph("fig6.2b.pdf")
r('barplot(counts, main="Grouped Bar Plot", xlab="Treatment", ylab="Frequency",
col=c("red", "yellow", "green"), legend=rownames(counts), beside=TRUE)')
offGraph()
html.table([[getGraph(fig6_2a, fac=0.5), getGraph(fig6_2b, fac=0.5)])]
```



```
# fig 6.5
fig6_5 = preGraph("fig6.5.pdf")
r('attach(Arthritis)')
r('counts <- table(Treatment, Improved)')
r('spine(counts, main="Spinogram Example")')
r('detach(Arthritis)')
postGraph(fig6_5, fac=0.6)
```



```
# plotrixパッケージを使用するため、1回のみ実行
# r('install.packages("plotrix")')
```

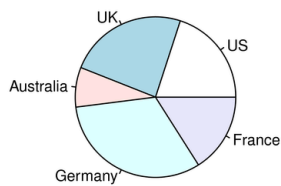
```
# fig 6.6
fig6_6 = preGraph("fig6.6.pdf")
r('par(mfrow=c(2, 2))')
r('slices <- c(10, 12, 4, 16, 8)')
```

```

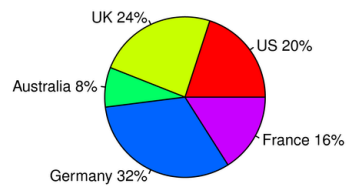
r('lbls <- c("US", "UK", "Australia", "Germany", "France")')
r('pie(slices, labels = lbls, main="Simple Pie Chart")')
r('pct <- round(slices/sum(slices)*100)')
r('lbls2 <- paste(lbls, " ", pct, "%", sep="")')
r('pie(slices, labels=lbls2, col=rainbow(length(lbls2)), main="Pie Chart with Percentages")')
r('library(plotrix)')
r('pie3D(slices, labels=lbls,explode=0.1, main="3D Pie Chart ")')
r('mytable <- table(state.region)')
r('lbls3 <- paste(names(mytable), "\n", mytable, sep="")')
r('pie(mytable, labels = lbls3, main="Pie Chart from a Table\n (with sample sizes)")')
postGraph(fig6_6, fac=0.6)

```

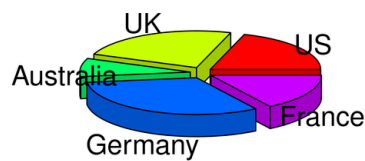
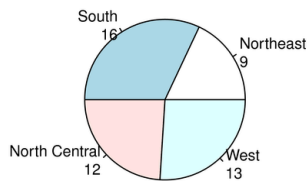
Simple Pie Chart



Pie Chart with Percentages



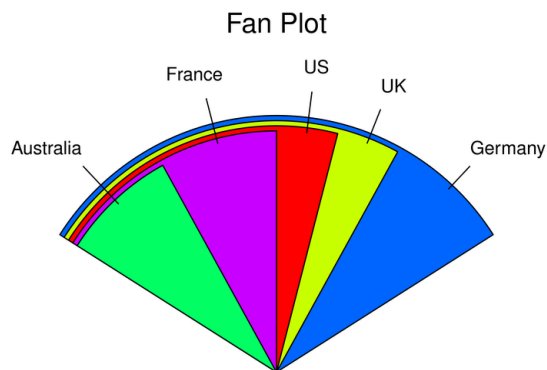
3D Pie Chart

Pie Chart from a Table
(with sample sizes)

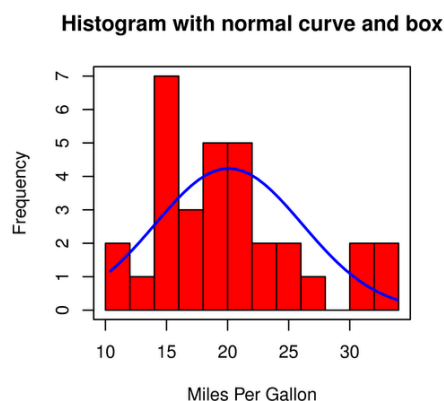
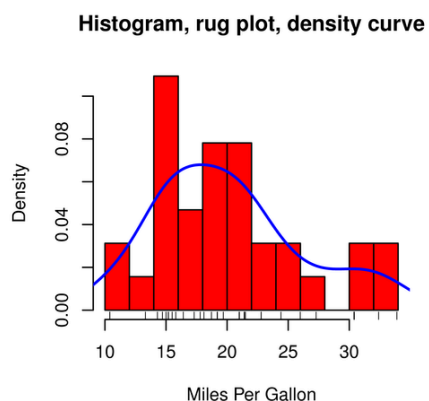
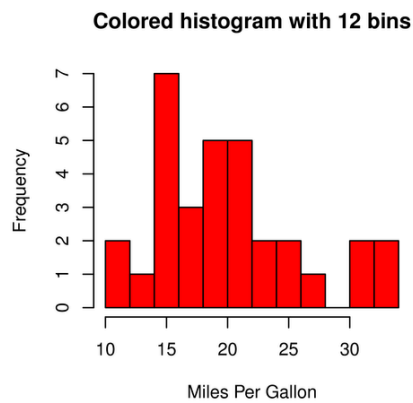
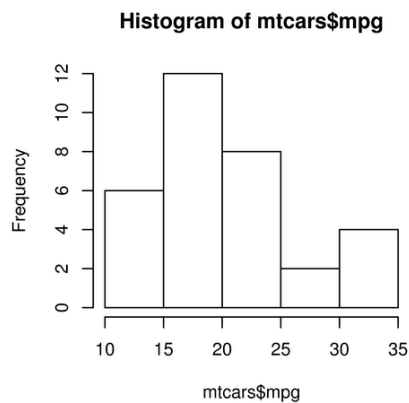
```

# fig 6.7
fig6_7 = preGraph("fig6.7.pdf")
r('fan.plot(slices, labels = lbls, main="Fan Plot")')
postGraph(fig6_7, fac=0.6)

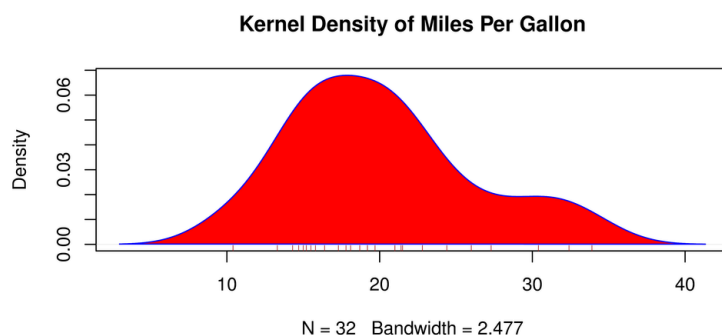
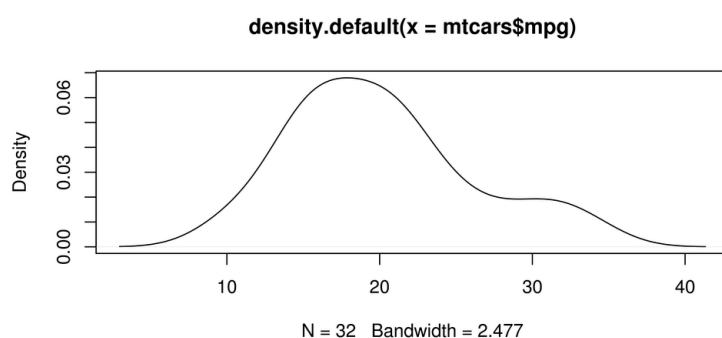
```



```
# fig 6.8
fig6_8 = preGraph("fig6.8.pdf")
r('par(mfrow=c(2,2))')
r('hist(mtcars$mpg)')
r('hist(mtcars$mpg, breaks=12, col="red", xlab="Miles Per Gallon", main="Colored
histogram with 12 bins")')
r('hist(mtcars$mpg, freq=FALSE, breaks=12, col="red", xlab="Miles Per Gallon",
main="Histogram, rug plot, density curve")')
r('rug(jitter(mtcars$mpg))')
r('lines(density(mtcars$mpg), col="blue", lwd=2)')
r('x <- mtcars$mpg')
r('h<-hist(x, breaks=12, col="red", xlab="Miles Per Gallon", main="Histogram with
normal curve and box")')
r('xfit<-seq(min(x), max(x), length=40)')
r('yfit<-dnorm(xfit, mean=mean(x), sd=sd(x))')
r('yfit <- yfit*diff(h$mids[1:2])*length(x)')
r('lines(xfit, yfit, col="blue", lwd=2)')
r('box()')
postGraph(fig6_8, fac=0.7)
```

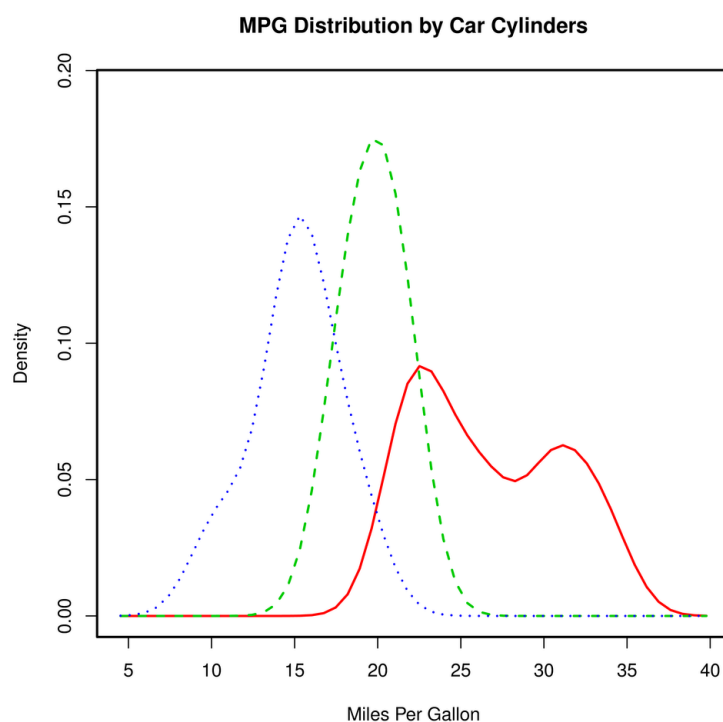


```
# fig 6.9
fig6_9 = preGraph("fig6.9.pdf")
r('par(mfrow=c(2,1))')
r('d <- density(mtcars$mpg)')
r('plot(d)')
r('plot(d, main="Kernel Density of Miles Per Gallon")')
r('polygon(d, col="red", border="blue")')
r('rug(mtcars$mpg, col="brown")')
postGraph(fig6_9, fac=0.6)
```

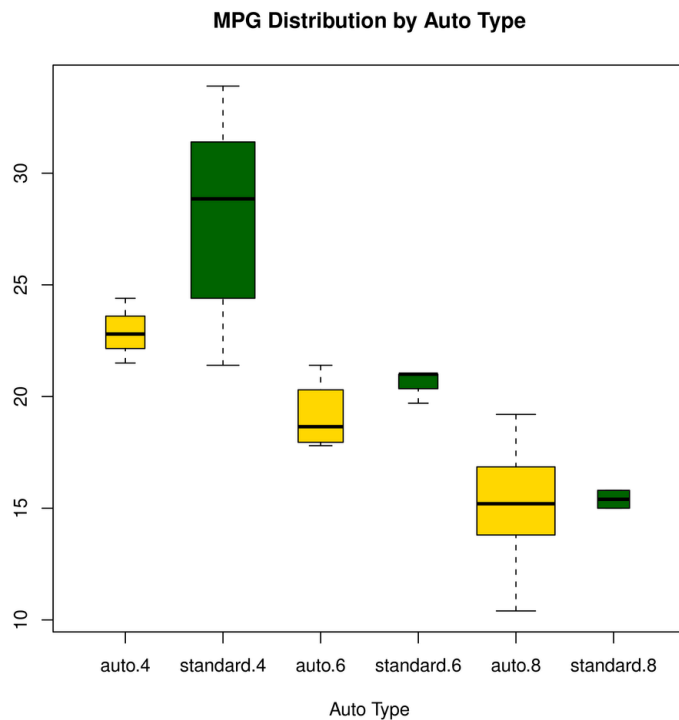



```
# smパッケージを使用するため、1回のみ実行
# r('install.packages("sm")')
```

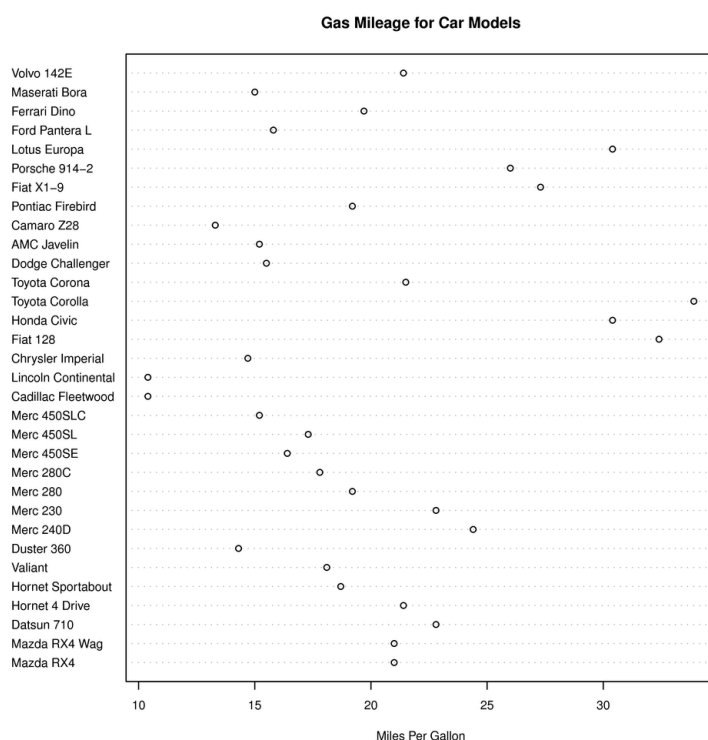
```
# fig 6.10
# 凡例が表示されない
fig6_10 = preGraph("fig6.10.pdf")
r('par(lwd=2)')
r('library(sm)')
r('attach(mtcars)')
r('cyl.f <- factor(cyl, levels= c(4,6,8), labels = c("4 cylinder", "6 cylinder", "8 cylinder"))')
r('sm.density.compare(mpg, cyl, xlab="Miles Per Gallon")')
r('title(main="MPG Distribution by Car Cylinders")')
r('colfill<-c(2:(1+length(levels(cyl.f))))')
r('legend(locator(1), levels(cyl.f), fill=colfill)')
r('detach(mtcars)')
postGraph(fig6_10, fac=0.6)
```



```
# fig 6.14
fig6_14 = preGraph("fig6.14.pdf")
r('mtcars$cyl.f <- factor(mtcars$cyl, levels=c(4,6,8), labels=c("4","6","8"))')
r('mtcars$am.f <- factor(mtcars$am, levels=c(0,1), labels=c("auto", "standard"))')
r('boxplot(mpg ~ am.f * cyl.f, data=mtcars, varwidth=TRUE, col=c("gold", "darkgreen"),
main="MPG Distribution by Auto Type", xlab="Auto Type")')
postGraph(fig6_14, fac=0.6)
```

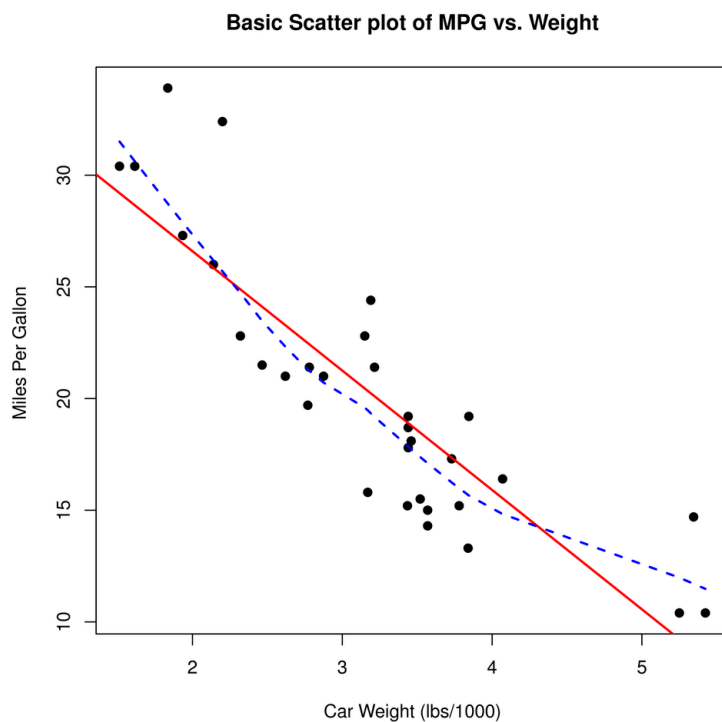


```
# fig 6.16
fig6_16 = preGraph("fig6.16.pdf")
r('dotchart(mtcars$mpg, labels=row.names(mtcars), cex=.7, main="Gas Mileage for Car
Models", xlab="Miles Per Gallon")')
postGraph(fig6_16, fac=0.6)
```

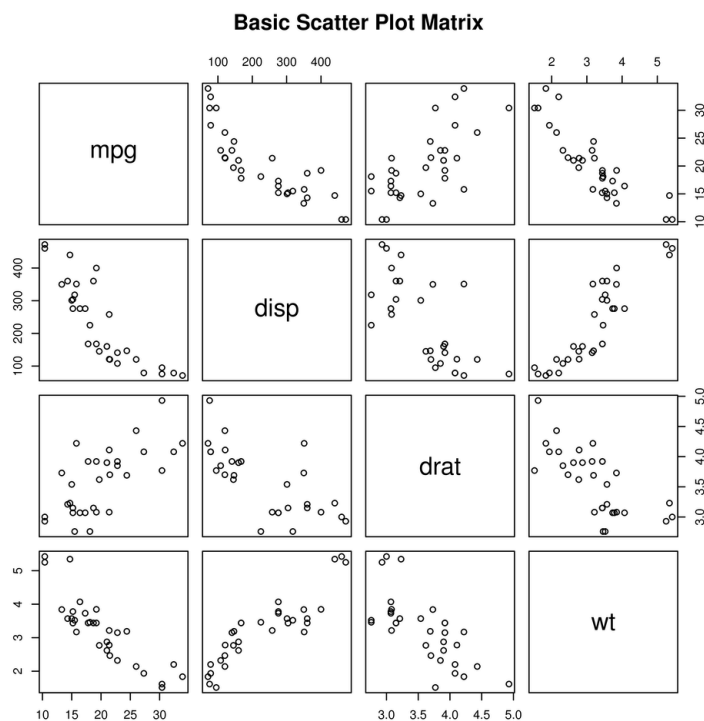


```
# fig 11.1
fig11_1 = preGraph("fig11.1.pdf")
r('attach(mtcars)')
r('plot(wt, mpg, main="Basic Scatter plot of MPG vs. Weight", xlab="Car Weight
(lbs/1000)", ylab="Miles Per Gallon ", pch=19)')
r('abline(lm(mpg~wt), col="red", lwd=2, lty=1)')
```

```
r('lines(lowess(wt,mpg), col="blue", lwd=2, lty=2)')
postGraph(fig11_1, fac=0.6)
```



```
# fig 11.3
fig11_3 = preGraph("fig11.3.pdf")
r('pairs(~mpg+disp+drat+wt, data=mtcars, main="Basic Scatter Plot Matrix")')
postGraph(fig11_3, fac=0.6)
```



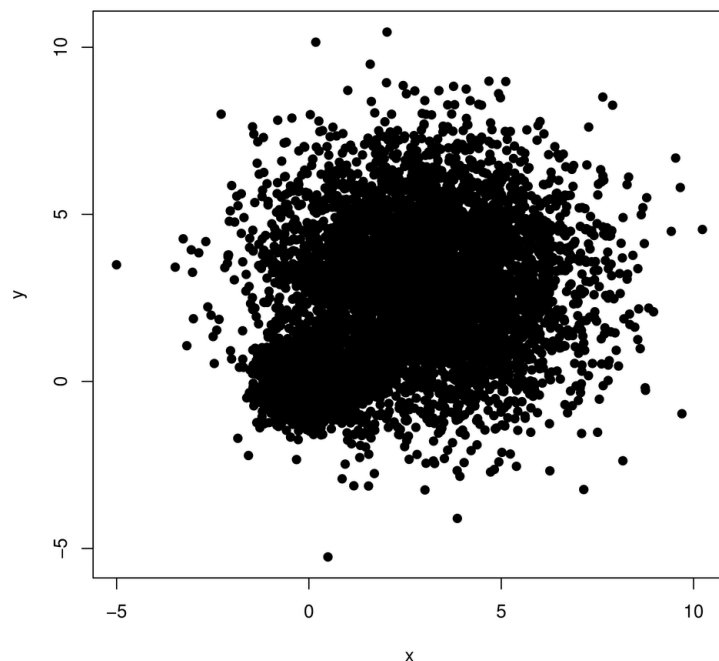
```
# 散布図がつぶれてしまったような場合の対処方法
r('set.seed(1234)')
r('n <- 10000')
r('c1 <- matrix(rnorm(n, mean=0, sd=.5), ncol=2)')
r('c2 <- matrix(rnorm(n, mean=3, sd=2), ncol=2)')
r('mydata <- rbind(c1, c2)')
```

```
r('mydata <- as.data.frame(mydata)')
r('names(mydata) <- c("x", "y")')
```

```
[1] "x" "y"
```

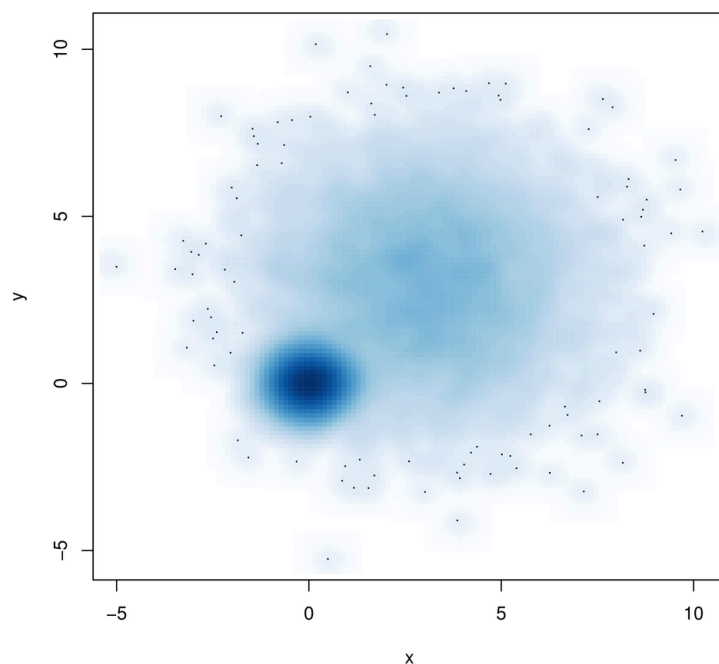
```
fig11_7 = preGraph("fig11.7.pdf")
r('with(mydata, plot(x, y, pch=19, main="Scatter Plot with 10,000 Observations"))')
postGraph(fig11_7, fac=0.6)
```

Scatter Plot with 10,000 Observations



```
# fig 11.8
fig11_8 = preGraph("fig11.8.pdf")
r('with(mydata, smoothScatter(x, y, main="Scatterplot Colored by Smoothed
Densities"))')
postGraph(fig11_8, fac=0.6)
```

Scatterplot Colored by Smoothed Densities



```
r('ftable(Titanic)')
```

			Survived	No	Yes
Class	Sex	Age			
1st	Male	Child		0	5
		Adult		118	57
	Female	Child		0	1
		Adult		4	140
2nd	Male	Child		0	11
		Adult		154	14
	Female	Child		0	13
		Adult		13	80
3rd	Male	Child		35	13
		Adult		387	75
	Female	Child		17	14
		Adult		89	76
Crew	Male	Child		0	0
		Adult		670	192
	Female	Child		0	0
		Adult		3	20

```
# fig 11.23
r('library(vcd)')
fig11_23 = preGraph("fig11.23.pdf")
r('mosaic(Titanic, shade=TRUE, legend=TRUE)')
postGraph(fig11_23, fac=0.6)
```

