```r
## convergence p.s.
n=5000
par(mfrow=c(2,1))
x=rnorm(n)
y=cumsum(x)/(1:n)
plot(y,type="l")
abline(h=0,col="red")
xc=rcauchy(n,0,1)
yc=cumsum(xc)/(1:n)
plot(yc,type="l")
abline(h=0,col="red")

## estimation de la densité
x=rnorm(1000)
y=density(x)
hist(x,proba=T,main="")
lines(y,col="blue")
z=seq(min(x),max(x),0.01)
lines(z,dnorm(z),lty=2,col="red")

## mélange de lois
n=100
w=rbinom(n,1,1/4)
sample=w*rnorm(n,5)+(1-w)*rnorm(n,-5)
hist(sample,breaks=15,proba=T,main="")
kernels=c("gaussian", "epanechnikov", "rectangular", "triangular", "biweight", "cosine", "optcosine")
lines(density(sample,n=2^13))
for(i in 2:7)
lines(density(sample,kern=kernels[i],n=2^13),col=i)
z=seq(min(sample),max(sample),0.01)
lines(z,dnorm(z,5)/4+dnorm(z,-5)*3/4,lty=2,col="red")

## fdr
x=rnorm(100)
fn=ecdf(x)
plot(fn,verticals = TRUE, do.points = FALSE)
z=seq(min(x),max(x),0.01)
lines(z,pnorm(z),col=3,lwd=2)

## régression linéaire
reg=lm(dist~speed,data=cars)
summary(reg)
x11()
plot(cars$speed,cars$dist)
abline(reg,col="red")
x11()
par(mfrow=c(2,2))
plot(reg)
```