Practical 11

For 10 Normally distributed random variables obtain kernel density estimator and plot KDE with individual bumps . also plot KDE for varying bendwidth h

Workout

First of all we generate 10 ranom variables from normal distribution

```
set.seed(400)
X<-rnorm(10)
n=10
```

Creating function for $\hat{f}$, using normal pdf function as kernel density function

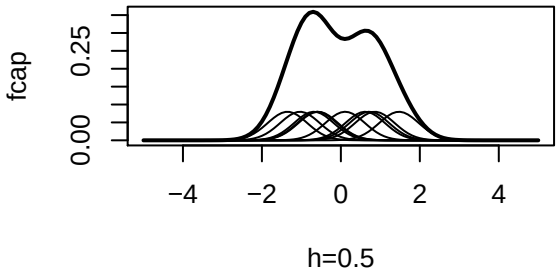
```
fcap<-Vectorize(
  function(x,h=0.5)
  {
    return((1/(n*h))*sum(dnorm((x-X)/h)))
  }
)
```

creting function for individual bumps

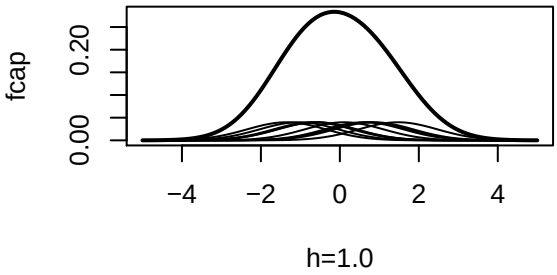
```
f<-function(x,X,h)
{
  (1/(n*h))*dnorm((x-X)/h)
}
```

Creating curve of the bumps and $\hat{f}$

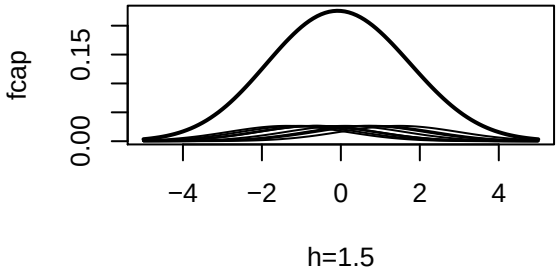
```
par(mfrow=c(2,2))
curve(fcap(x,h=0.5),lwd=2,xlim=c(-5,5),ylab="fcap",xlab="h=0.5")
for(i in 1:10)
  curve(f(x,X[i],h=0.5),add=T)
curve(fcap(x,h=1.0),lwd=2,xlim=c(-5,5),ylab="fcap",xlab="h=1.0")
for(i in 1:10)
  curve(f(x,X[i],h=1),add=T)
curve(fcap(x,h=1.5),lwd=2,xlim=c(-5,5),ylab="fcap",xlab="h=1.5")
for(i in 1:10)
  curve(f(x,X[i],h=1.5),add=T)
curve(fcap(x,h=2.0),lwd=2,xlim=c(-5,5),ylab="fcap",xlab="h=2.0")
for(i in 1:10)
  curve(f(x,X[i],h=2),add=T)
```



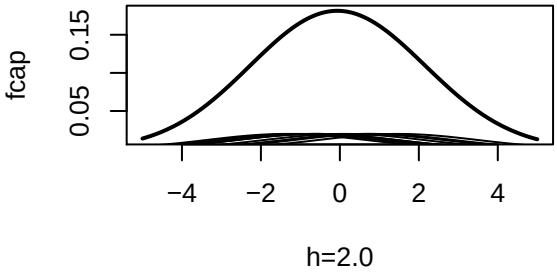
h=0.5



h=1.0



h=1.5



h=2.0