Análisis y Tratamiento de Datos con R: Departamento de Matemática

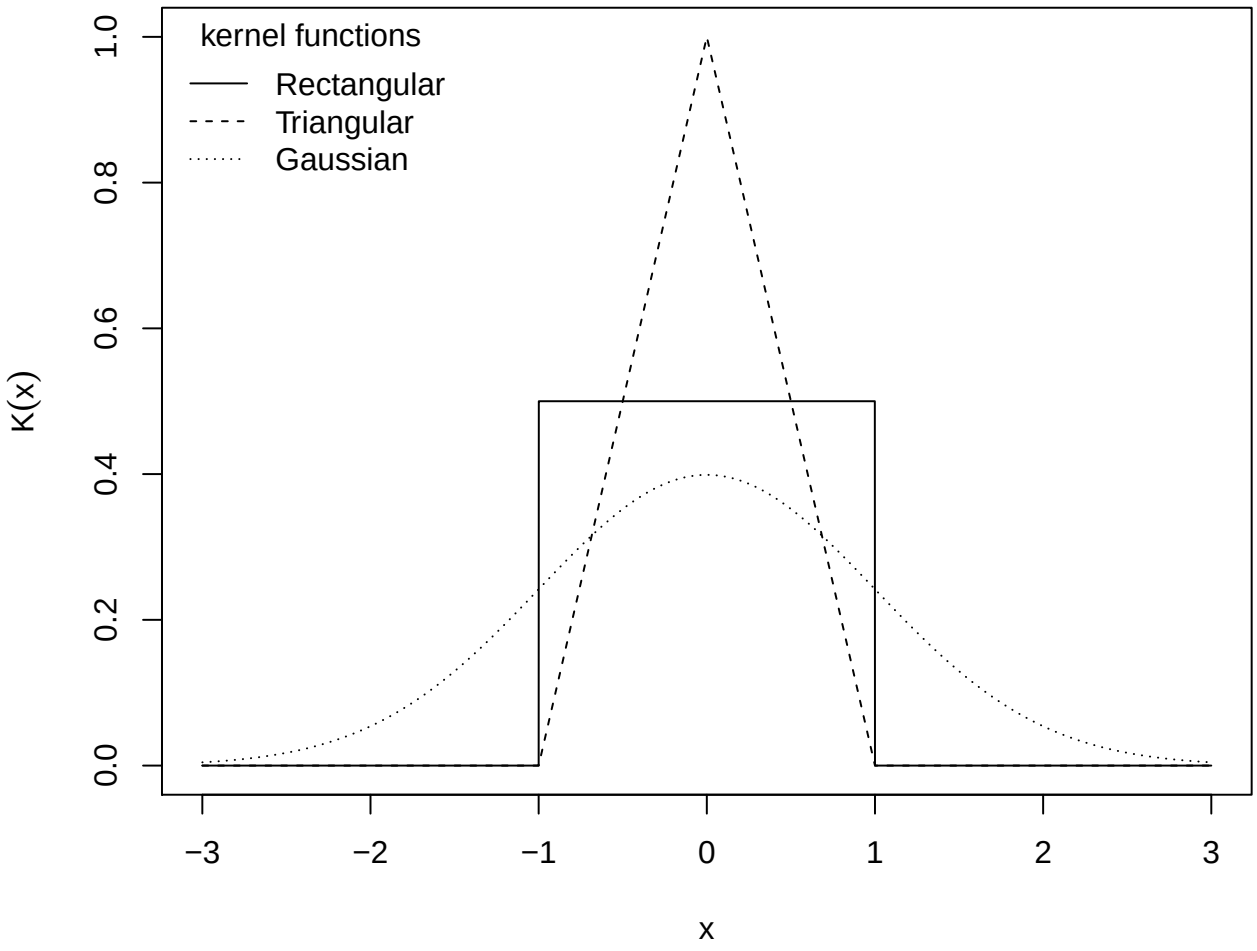
*

20 de noviembre de 2017

Suavizamiento por núcleos (Kernel smoothing)

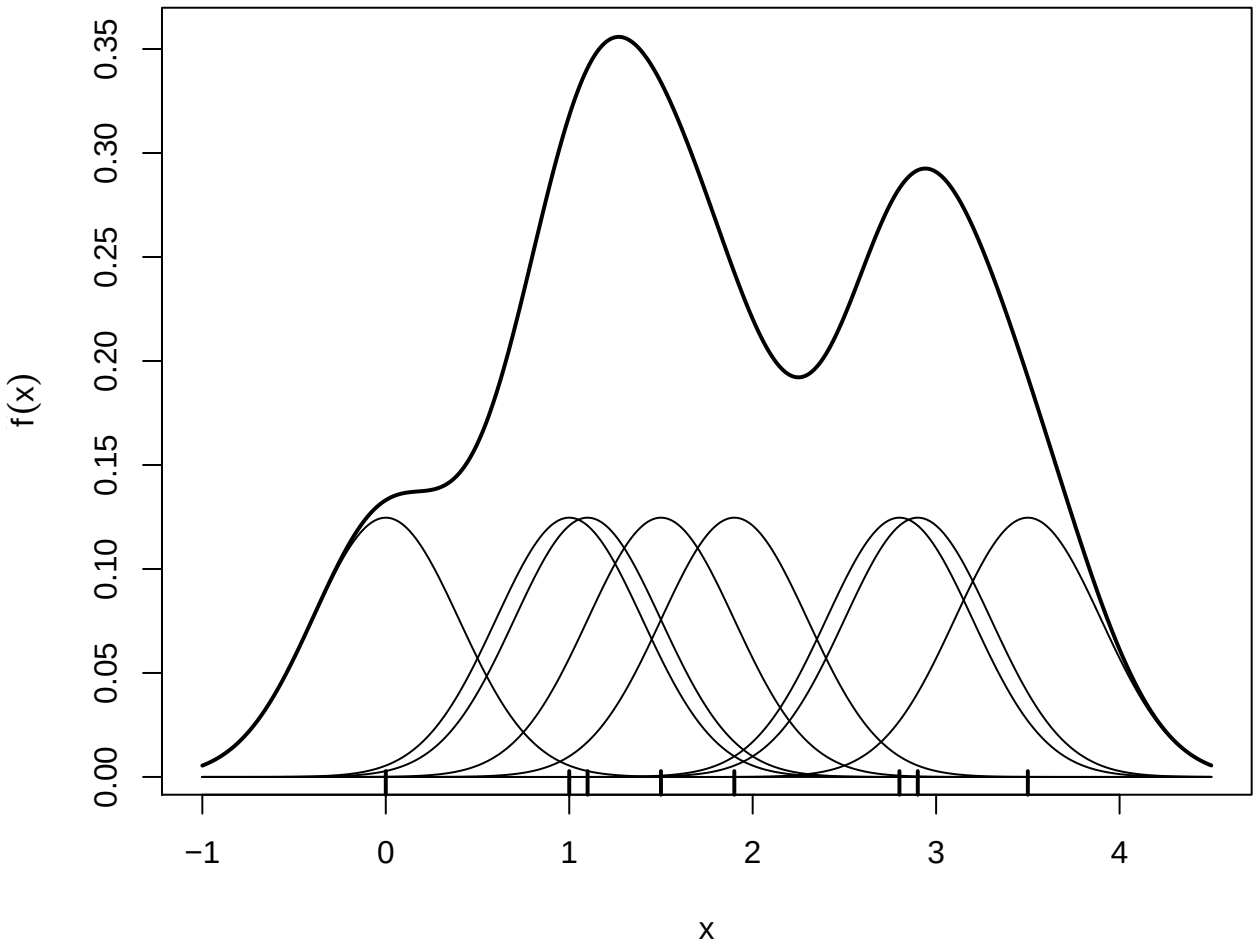
```
rec <- function(x) (abs(x) < 1) * 0.5
tri <- function(x) (abs(x) < 1) * (1 - abs(x))
gauss <- function(x) 1/sqrt(2*pi) * exp(-(x^2)/2)
x <- seq(from = -3, to = 3, by = 0.001)
plot(x, rec(x), type = "l", ylim = c(0,1), lty = 1,
  ylab = expression(K(x)))
  lines(x, tri(x), lty = 2)
  lines(x, gauss(x), lty = 3)
  legend("topleft", legend = c("Rectangular", "Triangular",
          "Gaussian"), lty = 1:3, title = "kernel functions",
  bty = "n")
```

*,




```
x <- c(0, 1, 1.1, 1.5, 1.9, 2.8, 2.9, 3.5)
n <- length(x)
xgrid <- seq(from = min(x) - 1, to = max(x) + 1, by = 0.01)
h <- 0.4
bumps <- sapply(x, function(a) gauss((xgrid - a)/h)/(n * h))

plot(xgrid, rowSums(bumps), ylab = expression(hat(f)(x)),
     type = "l", xlab = "x", lwd = 2)
rug(x, lwd = 2)
out <- apply(bumps, 2, function(b) lines(xgrid, b))
```



Regresión (modelos lineales)

```
fit <- lm(weight ~ height, data=women)
summary(fit)
```

```
##
## Call:
## lm(formula = weight ~ height, data = women)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.7333 -1.1333 -0.3833  0.7417  3.1167
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) -87.51667    5.93694  -14.74 1.71e-09 ***
## height        3.45000    0.09114   37.85 1.09e-14 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.525 on 13 degrees of freedom
## Multiple R-squared:  0.991,  Adjusted R-squared:  0.9903
## F-statistic:  1433 on 1 and 13 DF,  p-value: 1.091e-14
```

```
women$weight
```

```
##  [1] 115 117 120 123 126 129 132 135 139 142 146 150 154 159 164
```

```
fitted(fit)
```

```
##        1        2        3        4        5        6        7        8
## 112.5833 116.0333 119.4833 122.9333 126.3833 129.8333 133.2833 136.7333
##        9       10       11       12       13       14       15
## 140.1833 143.6333 147.0833 150.5333 153.9833 157.4333 160.8833
```

```
residuals(fit)
```

```
##           1           2           3           4           5           6
##  2.41666667  0.96666667  0.51666667  0.06666667 -0.38333333 -0.83333333
##           7           8           9          10          11          12
## -1.28333333 -1.73333333 -1.18333333 -1.63333333 -1.08333333 -0.53333333
##          13          14          15
##  0.01666667  1.56666667  3.11666667
```