# Breve curso de cálculo con R

## un vector

```
> v1 = c(7,3,9,1,4,9.9)
[1] 7.0 3.0 9.0 1.0 4.0 9.9
> v2 = 5:12
[1]  5  6  7  8  9 10 11 12
> v3 = seq(4, 32, by=4)
[1]  4  8 12 16 20 24 28 32
> v4 = rep(v2, 2)
 [1]  5  6  7  8  9 10 11 12  5
[10]  6  7  8  9 10 11 12
```

## un data.frame

```
> DF = data.frame(x=1:5, y=c('A',
'E','I','O','U'), z=v1[-6])
> DF
  x y z
1 1 A 7
2 2 E 3
3 3 I 9
4 4 O 1
5 5 U 4
> dim(DF)
[1] 5 3
```

## selección

```
> DF$x          # DF[,1], DF[,"x"]
[1] 1 2 3 4 5
> DF[3,]
  x y z
3 3 I 9
> DF[2:3,c("x","z")]
 x z
2 2 3
3 3 9
> DF[which(DF$z>5),] # DF[DF$z>5,]
  x y z
1 1 A 7
3 3 I 9
> which(DF$z>5)
[1] 1 3
> DF$z>5
[1]  TRUE FALSE  TRUE FALSE FALSE
```

## lectura

```
> DF = read.table('file.txt')
# ?read.table
# varios parámetros a conocer:
# header, sep, dec, colClasses, …
```

## Construir una matriz

```
> M = matrix(c(1,2,3,4,5,6,7,8,9),
nrow=3)
     [,1] [,2] [,3]
[1,]    1    4    7
[2,]    2    5    8
[3,]    3    6    9
> M[1:2,]
     [,1] [,2] [,3]
[1,]    1    4    7
[2,]    2    5    8
```

## Productos c. a c. vs matricial

```
> Q = 1/M
> M %*% t(Q)   # traspuesta
         [,1]  [,2]     [,3]
[1,] 3.000000 2.175 1.777778
[2,] 4.392857 3.000 2.388889
[3,] 5.785714 3.825 3.000000
> M * t(Q)
          [,1] [,2]     [,3]
[1,] 1.0000000 2.00 2.333333
[2,] 0.5000000 1.00 1.333333
[3,] 0.4285714 0.75 1.000000
```

## Obtener suma por filas

```
> mf = apply(M, 1, sum)
> mf
[1] 12 15 18
```

## Obtener suma por columnas

```
> mc = apply(M, 2, sum)
> mc
[1] 6 15 24
```

## Producto/cociente vectores componente a componente

```
> mf*mc
[1]  72 225 432
> mf/mc
[1] 2.00 1.00 0.75
```

## Producto escalar

```
> mf %*% mc
     [,1]
[1,]  729
> sum(mf*mc)     # alternativa
[1] 729
```