Econ 673 Lecture 5, 2017-01-17

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- tapply → factors.
- lapply → list.
- sapply → produces matrix.

ex. sapply(1:500, function(i) lm(y~[,i] $coef).

$$\rightarrow \begin{pmatrix}\hat{\beta}_0^1\\ \hat{\beta}_1^1\end{pmatrix}\begin{pmatrix}\hat{\beta}_0^2\\ \hat{\beta}_1^2\end{pmatrix}\cdots\begin{pmatrix}\hat{\beta}_0^{500}\\ \hat{\beta}_1^{500}\end{pmatrix}$$

2x500 matrix.

1) List : b[[i]] → vector of 2.

↓

make it a matrix

do.call(function, arguements into a list.

rnorm(n=, mean=, SD=,).

arg=list(n=100, mean=5, sd=2).

do.call(rnorm, arg).

execute rnorm(arg).

rbind, cbind:

rbind, cbind:

rbind(x, y) → $\begin{pmatrix} x \\ y \end{pmatrix}$

cbind(x, y) → $\begin{pmatrix} x & y \end{pmatrix}$

→ do.call(rbind, b)

can only be done if b is a list.

apply(A, , FUN)

array

which dimension to fix.

ex. $A_{100 \times 200}$ → SD on each column.

apply(A, 2, sd) → compute sd for each column.

colMeans(A).

uses apply(A, 2, sd).

colSums(A)

apply(A, 2, sum)

apply(A, 2, min).

apply(A, 2, function(x) max(x)-min(x)) → fastest way.

expression:

e1 ← expression(a*x/sin(x*b))

eval(e1, list(x=1, a=1, b=2))

⇒ D(e1, "x")

directive.

D(D(e1, "x"))

double directive

mclapply

Require library("parrot")

→ multicore

b ← mclapply(1:5000, function(i) lm(y~x[,i])$coef, mc.cores = 32).

Quadratic

$y = Ax^2 + Bx + c$

↓

object ("Quadra").

- solve (min / max)
- zeros ⇓ solve $y=0$.
- plot
- summary.

binary operator %+%

"%+%" ← function (Q1, Q2)

addquadra (Q1, Q2).

Consumer Suite:

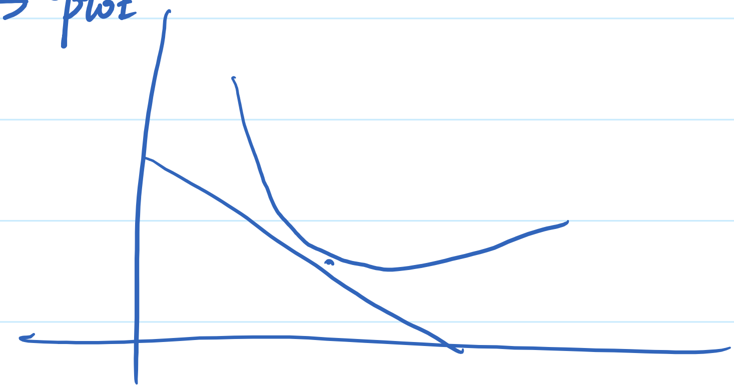
⇒ object of type "Consumer"

⇒ object of type "Consumer"

utility function. parameter name income.

→ solve (con, p_1, p_2).

→ plot



help ("%/%")

reminders. (integer)

a\b = 5.999

a%\%b = 5.

1 %\% 0.2 → 4 / 5.

different platform.

Std: IEEE 754.

Binary standard.

$47 = 2^0 + 2^1 + 2^3 + 2^5 = 101011$ Binary presentation of 47.

$10^1 + 2\times 10^2 + 3\times 10^5 = 300210.$

$47.125 = 47 + 2^{-3}$

101011.001

divid by 2

$(\underbrace{1}_{1 \text{ bits}}.\underbrace{0101001}_{10 \text{ bits}})2^{-5}$ 101 in binary. 3 bits.

$+$

$\underline{\pm}\,\underline{[d_0, d_1, d_2, \ldots, d_{p-1}]}\,2^{\underline{e}}.$

64 bits $\Rightarrow$ more precision.

In R, $p = 53$

$e_{max} = 1024$

$e_{min} = -1022.$

.Machine $

- Machine$double.exponent ⇒ 11
- Machine$double.max.exp ⇒ 1024

ex: $12.37 + 0.001$

$12.37 = 1.237 \times 10^{1}$

$0.001 = 1 \times 10^{-3}$

$$
\begin{array}{r}
1.237 \times 10^{1} \\
0.0001 \times 10^{1} \\
+ \hline
1.23
\end{array}
$$

machine.epsilon : ε

$1 + \varepsilon \stackrel{?}{=} 1$

does not change

$(1.\underbrace{00\cdots\cdots0}_{52}) \times 2^{0}$

$0.\underbrace{00\cdots\cdots0}_{52}1 = 2^{-53}$

(1+2^-53)==1 ⇒ TRUE.

Inf + Inf = Inf.

c/Inf = 0.

Inf/Inf = NaN

not a number.