tarea latex y Rmardown

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2024-04-24

Latex y RMarkdown

pregunta 1

Realiza los siguientes productosde matrices en R

$$A \cdot B$$
$$B \cdot A$$
$$(A \cdot B)^t$$
$$B^t \cdot A$$
$$(A \cdot B)^{-1}$$
$$A^{-1} \cdot B^t$$

Donde:

$$A = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 3 & 2 & 1 \\ 0 & 1 & 0 & 2 \\ 3 & 0 & 4 & 0 \end{pmatrix}$$
$$B = \begin{pmatrix} 4 & 3 & 2 & 1 \\ 0 & 3 & 0 & 4 \\ 1 & 2 & 3 & 4 \\ 0 & 1 & 0 & 2 \end{pmatrix}$$

Redacta todos tus resultados y utiliza LaTeXcuando toque

```
A=rbind(c(1:4),c(4:1),c(0,1,0,2),c(3,0,4,0))
A
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    1    2    3    4
## [2,]    4    3    2    1
## [3,]    0    1    0    2
## [4,]    3    0    4    0
```

```
B =rbind(c(4:1),c(0,3,0,4),c(1:4),c(0,1,0,2))
B
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    4    3    2    1
## [2,]    0    3    0    4
## [3,]    1    2    3    4
## [4,]    0    1    0    2
```

```r
print("A*B")
```

```
## [1] "A*B"
```

```r
A%*%B
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    7   19   11   29
## [2,]   18   26   14   26
## [3,]    0    5    0    8
## [4,]   16   17   18   19
```

```r
print("B*A")
```

```
## [1] "B*A"
```

```r
B%*%A
```

```
##      [,1] [,2] [,3] [,4]
## [1,]   19   19   22   23
## [2,]   24    9   22    3
## [3,]   21   11   23   12
## [4,]   10    3   10    1
```

```r
print("(A*B)^t")
```

```
## [1] "(A*B)^t"
```

```r
t(A%*%B)
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    7   18    0   16
## [2,]   19   26    5   17
## [3,]   11   14    0   18
## [4,]   29   26    8   19
```

```r
print("transpuesta de B por A")
```

```
## [1] "transpuesta de B por A"
```

```r
t(B)%*%A
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    4    9   12   18
## [2,]   18   17   19   19
## [3,]    2    7    6   14
## [4,]   23   18   19   16
```

```r
print("inversa de A*B")
```

```
## [1] "inversa de A*B"
```

```r
solve(A%*%B)
```

```
##       [,1]  [,2]  [,3]  [,4]
## [1,] -1.66 -0.65  4.52  1.52
## [2,]  1.60  0.80 -4.60 -1.60
## [3,]  1.02  0.35 -2.84 -0.84
## [4,] -1.00 -0.50  3.00  1.00
```

```r
print("inversa de A * transpuesta de B")
```

```
## [1] "inversa de A * transpuesta de B"
```

```r
solve(A)%*%t(B)
```

```
##               [,1] [,2] [,3] [,4]
## [1,]  6.000000e-01  2.4  6.4  1.2
## [2,] -9.992007e-16 -2.0 -7.0 -1.2
## [3,] -2.000000e-01 -0.8 -3.8 -0.4
## [4,]  1.000000e+00  1.0  5.0  0.6
```

$A \cdot B$

$$\begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 3 & 2 & 1 \\ 0 & 1 & 0 & 2 \\ 3 & 0 & 4 & 0 \end{pmatrix} \cdot \begin{pmatrix} 4 & 3 & 2 & 1 \\ 0 & 3 & 0 & 4 \\ 1 & 2 & 3 & 4 \\ 0 & 1 & 0 & 2 \end{pmatrix} = \begin{pmatrix} 7 & 19 & 11 & 29 \\ 18 & 26 & 14 & 26 \\ 0 & 5 & 0 & 8 \\ 16 & 17 & 18 & 19 \end{pmatrix}$$

$B \cdot A$

$$\begin{pmatrix} 4 & 3 & 2 & 1 \\ 0 & 3 & 0 & 4 \\ 1 & 2 & 3 & 4 \\ 0 & 1 & 0 & 2 \end{pmatrix} \cdot \begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 3 & 2 & 1 \\ 0 & 1 & 0 & 2 \\ 3 & 0 & 4 & 0 \end{pmatrix} = \begin{pmatrix} 19 & 19 & 22 & 23 \\ 24 & 9 & 22 & 3 \\ 21 & 11 & 23 & 12 \\ 10 & 3 & 10 & 1 \end{pmatrix}$$

$(A \cdot B)^t$

$$\left(\begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 3 & 2 & 1 \\ 0 & 1 & 0 & 2 \\ 3 & 0 & 4 & 0 \end{pmatrix} \cdot \begin{pmatrix} 4 & 3 & 2 & 1 \\ 0 & 3 & 0 & 4 \\ 1 & 2 & 3 & 4 \\ 0 & 1 & 0 & 2 \end{pmatrix} \right)^t = \begin{pmatrix} 7 & 18 & 0 & 16 \\ 19 & 26 & 5 & 17 \\ 11 & 14 & 0 & 18 \\ 29 & 26 & 8 & 19 \end{pmatrix}$$

$B^t \cdot A$

$$\left(\begin{pmatrix} 4 & 3 & 2 & 1 \\ 0 & 3 & 0 & 4 \\ 1 & 2 & 3 & 4 \\ 0 & 1 & 0 & 2 \end{pmatrix} \right)^t = \begin{pmatrix} 4 & 0 & 1 & 0 \\ 3 & 3 & 2 & 1 \\ 2 & 0 & 3 & 0 \\ 1 & 4 & 4 & 2 \end{pmatrix} \cdot$$

$$\begin{pmatrix} 4 & 0 & 1 & 0 \\ 3 & 3 & 2 & 1 \\ 2 & 0 & 3 & 0 \\ 1 & 4 & 4 & 2 \end{pmatrix} \cdot \begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 3 & 2 & 1 \\ 0 & 1 & 0 & 2 \\ 3 & 0 & 4 & 0 \end{pmatrix} = \begin{pmatrix} 4 & 9 & 12 & 18 \\ 18 & 17 & 19 & 19 \\ 2 & 7 & 6 & 14 \\ 23 & 18 & 19 & 16 \end{pmatrix}$$

```r
solve(A%*%B)
```

```
##       [,1]  [,2]  [,3]  [,4]
## [1,] -1.66 -0.65  4.52  1.52
## [2,]  1.60  0.80 -4.60 -1.60
## [3,]  1.02  0.35 -2.84 -0.84
## [4,] -1.00 -0.50  3.00  1.00
```

$(A \cdot B)^{-1}$

$$\left(\begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 3 & 2 & 1 \\ 0 & 1 & 0 & 2 \\ 3 & 0 & 4 & 0 \end{pmatrix} \cdot \begin{pmatrix} 4 & 3 & 2 & 1 \\ 0 & 3 & 0 & 4 \\ 1 & 2 & 3 & 4 \\ 0 & 1 & 0 & 2 \end{pmatrix} \right)^{-1} = \begin{pmatrix} -1.66 & 0.65 & 4.52 & 1.52 \\ 1.60 & 0.80 & -4.60 & -1.60 \\ 1.02 & 0.35 & -2.84 & -0.84 \\ -1.00 & -0.50 & 3.00 & 1.00 \end{pmatrix}$$

$A^{-1} \cdot B^t$

$$\begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 3 & 2 & 1 \\ 0 & 1 & 0 & 2 \\ 3 & 0 & 4 & 0 \end{pmatrix}^{-1} = \begin{pmatrix} -0.8 & 0.0 & 1.6 & 0.6 \\ 0.8 & 0.4 & -1.8 & -0.8 \\ 0.6 & 0.0 & -1.2 & -0.2 \\ -0.4 & -0.2 & 1.4 & 0.4 \end{pmatrix}$$

$$\begin{pmatrix} 4 & 3 & 2 & 1 \\ 0 & 3 & 0 & 4 \\ 1 & 2 & 3 & 4 \\ 0 & 1 & 0 & 2 \end{pmatrix}^{t} = \begin{pmatrix} 4 & 0 & 1 & 0 \\ 3 & 3 & 2 & 1 \\ 2 & 0 & 3 & 0 \\ 1 & 4 & 4 & 2 \end{pmatrix}$$

```
round(solve(A)%*%t(B),2)
```

```
##      [,1] [,2] [,3] [,4]
## [1,]  0.6  2.4  6.4  1.2
## [2,]  0.0 -2.0 -7.0 -1.2
## [3,] -0.2 -0.8 -3.8 -0.4
## [4,]  1.0  1.0  5.0  0.6
```

$$\begin{pmatrix} -0.8 & 0.0 & 1.6 & 0.6 \\ 0.8 & 0.4 & -1.8 & -0.8 \\ 0.6 & 0.0 & -1.2 & -0.2 \\ -0.4 & -0.2 & 1.4 & 0.4 \end{pmatrix} \cdot \begin{pmatrix} 4 & 0 & 1 & 0 \\ 3 & 3 & 2 & 1 \\ 2 & 0 & 3 & 0 \\ 1 & 4 & 4 & 2 \end{pmatrix} = \begin{pmatrix} 0.6 & 2.4 & 6.4 & 1.2 \\ 0.0 & -2.0 & -7.0 & -1.2 \\ -0.2 & -0.8 & -3.8 & -0.4 \\ 1.0 & 1.0 & 5.0 & 0.6 \end{pmatrix}$$

Pregunta 2

Considera en un vector los números de tu DNI(puedes inventartelos) y llámalo **dni**, Por ejemplo si tu DNI es $54201567K$, tu vector será

$$\text{dni} = (5, 4, 2, 0, 1, 5, 6, 7)$$

Define el vector en `R` Calcula con `R` el vector dni al cuadrado, la raiz cuadrada del vector **dni** y por último, la suma de todas las cifras del vector **dni**.

Redacta todos tus resultados y utiliza LaTeXcuando toque

```
dni =c(14,7,1,22,4,9,7,0)
(dni)^2
```

```
## [1] 196  49   1 484  16  81  49   0
```

```
round(sqrt(dni),2)
```

```
## [1] 3.74 2.65 1.00 4.69 2.00 3.00 2.65 0.00
```

```
sum(dni)
```

```
## [1] 64
```

$\text{dni} = (14, 7, 1, 22, 4, 9, 7, 0)$

$\text{dni}^2 = 196,\ 49,\ 1,\ 484,\ 16,\ 81,\ 49,\ 0$

$\sqrt{dni} = 3.74,\ 2.65,\ 1,\ 4.69,\ 2,\ 3,\ 2.65,\ 0$

la suma de todas las cifras del vector **dni** $= 64$

Pregunta 3

Considera el vector de las letras de tu nombre y apellido. Llámalo **name**. Por ejemplo,

$$\text{name } = (M, A, R, I, A, S, A, N, T, O, S)$$

Define dicho vector en R Calcula el subvector que solo contenga tu nombre. Calcula también el subvector que contenga solo tu apellido. Ordénalo alfabeticamente. Crea una matriz con ese vector.

Redacta todos tus resultados y utiliza LaTeXcuando toque

```
 name = c('j','u','a','n','h','a','r','o')
name[0:4]
```

```
## [1] "j" "u" "a" "n"
```

```
name[5:length(name)]
```

```
## [1] "h" "a" "r" "o"
```

```
sortered.name=sort(name)
sortered.name
```

```
## [1] "a" "a" "h" "j" "n" "o" "r" "u"
```

```
matrix(sortered.name,nrow = 4,byrow = T)
```

```
##      [,1] [,2]
## [1,] "a"  "a"
## [2,] "h"  "j"
## [3,] "n"  "o"
## [4,] "r"  "u"
```

$\text{name } = (\prime j\prime, \prime u\prime, \prime a\prime, \prime n\prime, \prime h\prime, \prime a\prime, \prime r\prime, \prime o\prime))$ ‘

$\text{nombre } = (\prime j\prime, \prime u\prime, \prime a\prime, \prime n\prime)$

$\text{apellido } = (\prime h\prime, \prime a\prime, \prime r\prime, \prime o\prime)$

$\text{name ordenado alfabeticamente } = (\text{”}a\text{”}, \text{”}a\text{”}, \text{”}h\text{”}, \text{”}j\text{”}, \text{”}n\text{”}, \text{”}o\text{”}, \text{”}r\text{”}, \text{”}u\text{”})$

$$\text{matriz con el nombre ordenado alfabeticamente } = \begin{pmatrix} \text{”}a\text{”} & \text{”}a\text{”} \\ \text{”}h\text{”} & \text{”}j\text{”} \\ \text{”}n\text{”} & \text{”}o\text{”} \\ \text{,”}r\text{”} & \text{”}u\text{”} \end{pmatrix}$$