

Actividad | # 1 | Matrices

Ingeniería en Desarrollo de Software



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1 Introducción

Las matrices son números y símbolos que se organizan en filas y columnas, los cuales se utilizan para poder organizar y manipular enormes cantidades de datos.

2 Descripción

En esta actividad aprenderemos a crear matrices, las cuales debemos multiplicar dicha matriz por una escalar, también crearemos matrices de sumas y restas las cuales se utilizan sumando y restando los elementos correspondientes de dichas matrices.

3 Justificación

Las matrices estas fechas para guardad cantidades enormes de información los cuales son una herramienta muy eficaz a la hora de solicitar datos que necesitemos, esto nos ayuda a tener una mejora en la productividad.

4 Desarrollo

4.1 Matriz 1

1) Sean las matrices:

$$A = \begin{bmatrix} 1 & 3 \\ -2 & 0 \end{bmatrix} \quad B = \begin{bmatrix} 4 & 1 \\ 2 & -3 \end{bmatrix} \quad C = \begin{bmatrix} 2 & -2 \\ 1 & 5 \end{bmatrix}$$

Ejecutar las siguientes operaciones: 1) 5A 2) 2A + B 3) 3A - 4B 4) B - 2C 5) 2A + (B - C)

The screenshot shows the RStudio interface with the following components:

- Console:** Contains R code to create matrices A, B, and C, and their operations.
- Environment:** Displays the matrices created in the Global Environment.
- Files:** Shows the project structure with files for each operation.

R Code in Console:

```
> matrizA  
      [,1] [,2]  
[1,]    1    3  
[2,]   -2    0  
>  
> matrizB <- matrix(nrow = 2, ncol = 2)  
>  
> matrizB[1, 1] <- 4  
> matrizB[1, 2] <- 1  
> matrizB[2, 1] <- 2  
> matrizB[2, 2] <- -3  
> matrizB  
      [,1] [,2]  
[1,]    4    1  
[2,]    2   -3  
>  
> matrizC <- matrix(nrow = 2, ncol = 2)  
>  
> matrizC[1, 1] <- 2  
> matrizC[1, 2] <- -2  
> matrizC[2, 1] <- 1  
> matrizC[2, 2] <- 5  
> matrizC  
      [,1] [,2]  
[1,]    2   -2  
[2,]    1    5
```

Environment Pane:

Object	Class	Attributes	Value
matrizA	num	[1:2, 1:2]	1 -2 3 0
matrizB	num	[1:2, 1:2]	4 2 1 -3
matrizC	num	[1:2, 1:2]	2 1 -2 5

Files Pane:

Name	Size	Modified
1) 5A.R	519 B	Feb 28, 2025, 2:50 AM
2) 2A + BC.R	546 B	Feb 28, 2025, 3:07 AM
3) 3A - 4B.R	591 B	Feb 28, 2025, 2:25 AM
4) B - 2C.R	554 B	Feb 28, 2025, 2:34 AM
5) 2A + (B-C).R	595 B	Feb 28, 2025, 2:46 AM

1) $5^a =$

The screenshot displays the RStudio environment with the following components:

- Source Editor:** Contains a script with the following code:

```
> escalar <- matrizA * 5
> escalar
      [,1] [,2]
[1,]    5   15
[2,]   -10    0
> View(escalar)
>
```
- Environment Pane:** Shows the following data objects:

Object	Class	Dimensions	Values
escalar	num	[1:2, 1:2]	5 -10 15 0
matrizA	num	[1:2, 1:2]	1 -2 3 0
matrizB	num	[1:2, 1:2]	4 2 1 -3
matrizC	num	[1:2, 1:2]	2 1 -2 5
- Console:** Shows the execution of the code in the Source Editor.
- Files Pane:** Displays the file explorer for the project directory, showing a folder named "matematicas matriciales" and a file named "SCRIP".
- Bottom Bar:** Shows the system tray with various icons and the date/time: 01:11 a. m., 28/02/2025.

$$2) 2A + B$$

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections Tutorial

R Global Environment

Data

Object	Class	Dimensions	Values
escalar	num	[1:2, 1:2]	2 -4 6 0
matrizA	num	[1:2, 1:2]	1 -2 3 0
matrizB	num	[1:2, 1:2]	4 2 1 -3
matrizC	num	[1:2, 1:2]	2 1 -2 5
suma	num	[1:2, 1:2]	6 -2 7 -3

Files Plots Packages Help Viewer Presentation

New Folder New File Delete Rename More

Home > matematicas natriciales > SCRIP

Name Size Modified

Activar Windows
Ve a Configuración para activar Windows.

```

> matrizA[1, 1] <- 1
> matrizA[1, 2] <- 3
> matrizA[2, 1] <- -2
> matrizA[2, 2] <- 0
>
> matrizA
      [,1] [,2]
[1,]    1    3
[2,]   -2    0
>
> escalar <- matrizA * 2
> escalar
      [,1] [,2]
[1,]    2    6
[2,]   -4    0
>
> matrizB <- matrix(nrow = 2, ncol = 2)
>
> matrizB[1, 1] <- 4
> matrizB[1, 2] <- 1
> matrizB[2, 1] <- 2
> matrizB[2, 2] <- -3
>
> matrizB
      [,1] [,2]
[1,]    4    1
[2,]    2   -3
>
> suma <- escalar + matrizB
> suma
      [,1] [,2]
[1,]    6    7
[2,]   -2   -3
>

```

16°C 01:43 a. m. 28/02/2025

3) $3A - 4B$

The screenshot shows the RStudio interface with the following components:

- Source Editor:** Contains the R script for creating matrices A and B, and calculating the result of $3A - 4B$.
- Console:** Displays the output of the R script, showing the matrices and the final result.
- Environment:** Lists the objects in the global environment: `escalar`, `matrizA`, `matrizB`, and `resta`.
- Files:** Shows the file explorer with a folder named `matemáticas matriciales` and a file named `2A+B.R`.

R Script (Source Editor):

```
> matrizA  
      [,1] [,2]  
[1,]    1    3  
[2,]   -2    0  
>  
> escalar <- matrizA * 3  
> escalar  
      [,1] [,2]  
[1,]    3    9  
[2,]   -6    0  
>  
> matrizB <- matrix(nrow = 2, ncol = 2)  
> matrizB[1, 1] <- 4  
> matrizB[1, 2] <- 1  
> matrizB[2, 1] <- 2  
> matrizB[2, 2] <- -3  
>  
> matrizB  
      [,1] [,2]  
[1,]    4    1  
[2,]    2   -3  
>  
> escalar <- matrizB * 4  
> escalar  
      [,1] [,2]  
[1,]   16    4  
[2,]    8  -12  
>  
> resta <- matrizA * 3 - matrizB * 4  
> resta  
      [,1] [,2]  
[1,]  -13    5  
[2,]  -14   12
```

Console Output:

```
> matrizA  
      [,1] [,2]  
[1,]    1    3  
[2,]   -2    0  
>  
> escalar <- matrizA * 3  
> escalar  
      [,1] [,2]  
[1,]    3    9  
[2,]   -6    0  
>  
> matrizB <- matrix(nrow = 2, ncol = 2)  
> matrizB[1, 1] <- 4  
> matrizB[1, 2] <- 1  
> matrizB[2, 1] <- 2  
> matrizB[2, 2] <- -3  
>  
> matrizB  
      [,1] [,2]  
[1,]    4    1  
[2,]    2   -3  
>  
> escalar <- matrizB * 4  
> escalar  
      [,1] [,2]  
[1,]   16    4  
[2,]    8  -12  
>  
> resta <- matrizA * 3 - matrizB * 4  
> resta  
      [,1] [,2]  
[1,]  -13    5  
[2,]  -14   12
```

Environment:

Object	Class	Attributes	Value
escalar	num	[1:2, 1:2]	16 8 4 -12
matrizA	num	[1:2, 1:2]	1 -2 3 0
matrizB	num	[1:2, 1:2]	4 2 1 -3
resta	num	[1:2, 1:2]	-13 -14 5 12

Files:

Name	Size	Modified
..		
2A+B.R	542 B	Feb 28, 2025, 1:53 AM

Windows Taskbar: Shows the system clock as 02:24 a.m. on 28/02/2025.

4) $B - 2C$

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections Tutorial

R Global Environment

Data

escalar	num	[1:2, 1:2]	4 2 -4 10	
matrizB	num	[1:2, 1:2]	4 2 1 -3	
matrizC	num	[1:2, 1:2]	2 1 -2 5	
resta	num	[1:2, 1:2]	0 0 5 -13	

Files Plots Packages Help Viewer Presentation

Folder File Delete Rename

Home > matematicas natriciales > SCRIP

	Name	Size	Modified
	..		
	2A+B.R	591 B	Feb 28, 2025, 2:25 AM
	3) 3A - 4B.R	591 B	Feb 28, 2025, 2:28 AM

Activar Windows
Ve a Configuración para activar Windows.

```
> matrizB[1, 1] <- 4
> matrizB[1, 2] <- 1
> matrizB[2, 1] <- 2
> matrizB[2, 2] <- -3
>
> matrizB
      [,1] [,2]
[1,]    4    1
[2,]    2   -3
>
> matrizC <- matrix(nrow = 2, ncol = 2)
>
> matrizC[1, 1] <- 2
> matrizC[1, 2] <- -2
> matrizC[2, 1] <- 1
> matrizC[2, 2] <- 5
>
> matrizC
      [,1] [,2]
[1,]    2   -2
[2,]    1    5
>
> escalar <- matrizC * 2
> escalar
      [,1] [,2]
[1,]    4   -4
[2,]    2   10
>
> resta <- matrizB - matrizC * 2
> resta
      [,1] [,2]
[1,]    0    5
[2,]    0  -13
> |
```


5) $2A + (B-C)$

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections Tutorial

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R Global Environment

Data

escalar	num	[1:2, 1:2]	2 -4 6 0	
matrizA	num	[1:2, 1:2]	1 -2 3 0	
matrizB	num	[1:2, 1:2]	4 2 1 -3	
matrizC	num	[1:2, 1:2]	2 1 -2 5	
resta	num	[1:2, 1:2]	2 1 3 -8	
suma	num	[1:2, 1:2]	4 -3 9 -8	

Files Plots Packages Help Viewer Presentation

Folder File Delete Rename

Home > matematicas naticiales > SCRIP

	Name	Size	Modified
	..		
<input type="checkbox"/>	2A+B.R	591 B	Feb 28, 2025, 2:25 AM
<input type="checkbox"/>	3) 3A - 4B.R	554 B	Feb 28, 2025, 2:34 AM
<input type="checkbox"/>	4) B-2C.R	554 B	Feb 28, 2025, 2:35 AM

Activar Windows
Ve a Configuración para activar Windows.

```
> matrizB[1, 1] <- 4
> matrizB[1, 2] <- 1
> matrizB[2, 1] <- 2
> matrizB[2, 2] <- -3
>
> matrizB
      [,1] [,2]
[1,]    4    1
[2,]    2   -3
>
> matrizC <- matrix(nrow = 2, ncol = 2)
>
> matrizC[1, 1] <- 2
> matrizC[1, 2] <- -2
> matrizC[2, 1] <- 1
> matrizC[2, 2] <- 5
>
> matrizC
      [,1] [,2]
[1,]    2   -2
[2,]    1    5
>
> resta <- matrizB - matrizC
> resta
      [,1] [,2]
[1,]    2    3
[2,]    1   -8
>
> suma <- matrizA * 2 + matrizB - matrizC
> suma
      [,1] [,2]
[1,]    4    9
[2,]   -3   -8
> |
```

Windows taskbar: 14°C, 02:45 a.m., 28/02/2025

1 Sean las matrices

$$A = \begin{bmatrix} 1 & 3 \\ -2 & 0 \end{bmatrix}$$

$$B = \begin{bmatrix} 4 & 1 \\ 2 & -3 \end{bmatrix}$$

$$C = \begin{bmatrix} 2 & -2 \\ 1 & 5 \end{bmatrix}$$

Ejecutar las siguientes operaciones

1) $5A$ 2) $2A+B$ 3) $3A-4B$ 4) $B-2C$ 5) $2A+(B-C) =$

$$1) 5A = 5 * \begin{bmatrix} 1 & 3 \\ -2 & 0 \end{bmatrix} = \begin{bmatrix} 5 & 15 \\ -10 & 0 \end{bmatrix}$$

$$2) 2A = 2 * \begin{bmatrix} 1 & 3 \\ -2 & 0 \end{bmatrix} = \begin{bmatrix} 2 & 6 \\ -4 & 0 \end{bmatrix} + \begin{bmatrix} 4 & 1 \\ 2 & -3 \end{bmatrix} = \begin{bmatrix} 6 & 7 \\ -2 & -3 \end{bmatrix}$$

$$3) 3A = 3 * \begin{bmatrix} 1 & 3 \\ -2 & 0 \end{bmatrix} = \begin{bmatrix} 3 & 9 \\ -6 & 0 \end{bmatrix} - 4B = 4 * \begin{bmatrix} 4 & 1 \\ 2 & -3 \end{bmatrix} = \begin{bmatrix} 16 & 4 \\ 8 & -12 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 9 \\ -6 & 0 \end{bmatrix} - \begin{bmatrix} 16 & 4 \\ 8 & -12 \end{bmatrix} = \begin{bmatrix} 3-16 & 9-4 \\ -6-8 & 0-(-12) \end{bmatrix} = \begin{bmatrix} -13 & 5 \\ -14 & 12 \end{bmatrix}$$

$$4) \quad B = \begin{bmatrix} 4 & 1 \\ 2 & -3 \end{bmatrix} - 2C = 2 \cdot \begin{bmatrix} 2 & -2 \\ 1 & -5 \end{bmatrix} = \begin{bmatrix} 4 & -4 \\ 2 & -10 \end{bmatrix}$$

$$B - 2C = \begin{bmatrix} 4 & 1 \\ 2 & -3 \end{bmatrix} - \begin{bmatrix} 4 & -4 \\ 2 & -10 \end{bmatrix} = \begin{bmatrix} 4-4 & 1-(-4) \\ 2-2 & -3-(-10) \end{bmatrix} = \begin{bmatrix} 0 & 5 \\ 0 & -13 \end{bmatrix}$$

$$5) \quad 2A = 2 \cdot \begin{bmatrix} 1 & 3 \\ -2 & 0 \end{bmatrix} = \begin{bmatrix} 2 & 6 \\ -4 & 0 \end{bmatrix} + \begin{bmatrix} 2 & 3 \\ 1 & -8 \end{bmatrix} = \begin{bmatrix} 4 & 9 \\ -3 & -8 \end{bmatrix}$$

$$(B - C) = \begin{bmatrix} 4 & 1 \\ 2 & -3 \end{bmatrix} - \begin{bmatrix} 2 & -2 \\ 1 & 5 \end{bmatrix} = \begin{bmatrix} 2 & 3 \\ 1 & -8 \end{bmatrix}$$

4.2 Matriz 2

2) Sean las matrices:

$$A = \begin{bmatrix} 1 & -2 & 1 \\ 3 & 0 & 4 \end{bmatrix} \quad B = \begin{bmatrix} -1 & 2 \\ 1 & 0 \\ 5 & -2 \end{bmatrix} \quad C = \begin{bmatrix} 1 & 3 \\ -4 & 2 \end{bmatrix}$$

Tachado

Ejecutar las siguientes operaciones: 1) $A*B$ 2) $B*C$ 3) $C*A$

The screenshot shows the RStudio interface. The console on the left contains the following R code:

```
R - R 4.4.2 - ~/matematicas matriciales/SCRIP/
> matrizA[, 3] <- 4
> matrizA
  [,1] [,2] [,3]
[1,]  1  -2   1
[2,]  3   0   4
>
> matrizB <- matrix(nrow = 3, ncol = 2)
> matrizB[1, 1] <- -1
> matrizB[1, 2] <- 2
> matrizB[2, 1] <- 1
> matrizB[2, 2] <- 0
> matrizB[3, 1] <- 5
> matrizB[3, 2] <- -2
>
> matrizB
  [,1] [,2]
[1,] -1   2
[2,]  1   0
[3,]  5  -2
>
> matrizC <- matrix(nrow = 2, ncol = 2)
> matrizC[1, 1] <- 1
> matrizC[1, 2] <- -3
> matrizC[2, 1] <- -4
> matrizC[2, 2] <- 2
>
> matrizC
  [,1] [,2]
[1,]  1  -3
[2,] -4   2
```

The Environment pane on the right shows the following data:

Object	Class	Dimensions	Values
matrizA	num	[1:2, 1:3]	1 3 -2 0 1 4
matrizB	num	[1:3, 1:2]	-1 1 5 2 0 -2
matrizC	num	[1:2, 1:2]	1 -4 -3 2

The Files pane shows a directory structure with the following files:

Name	Size	Modified
1) 5A.R	519 B	Feb 28, 2025, 2:50 AM
2) 2A + B.C.R	546 B	Feb 28, 2025, 3:07 AM
3) 3A - 4 B.R	591 B	Feb 28, 2025, 2:25 AM
4) B - 2C.R	554 B	Feb 28, 2025, 2:34 AM
5) 2A + (B-C).R	595 B	Feb 28, 2025, 2:46 AM
CREACIÓN DE MATRICES A,B,C.R	472 B	Mar 1, 2025, 10:38 PM

1) $A * B$

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Source

Console Terminal Background Jobs

```
R - R 4.4.2 - ~/matematicas naticiales/SCRIP/
> matrizA <- matrix(nrow = 2, ncol = 3)
>
> matrizA[1, 1] <- 1
> matrizA[1, 2] <- -2
> matrizA[1, 3] <- 1
> matrizA[2, 1] <- 3
> matrizA[2, 2] <- 0
> matrizA[2, 3] <- 4
>
> matrizA
      [,1] [,2] [,3]
[1,]    1   -2    1
[2,]    3    0    4
> matrizB <- matrix(nrow = 3, ncol = 2)
>
> matrizB[1, 1] <- -1
> matrizB[1, 2] <- 2
> matrizB[2, 1] <- 1
> matrizB[2, 2] <- 0
> matrizB[3, 1] <- 5
> matrizB[3, 2] <- -2
>
> matrizB
      [,1] [,2]
[1,]   -1    2
[2,]    1    0
[3,]    5   -2
> multiplicación <- matrizA %% matrizB
> multiplicación
      [,1] [,2]
[1,]    2    0
[2,]   17   -2
> |
```

Environment History Connections Tutorial

Import Dataset 103 MiB

R Global Environment

Data

matrizA	num	[1:2, 1:3]	1 3 -2	0 1 4	
matrizB	num	[1:3, 1:2]	-1 1 5	2 0 -2	
multiplicaci...	num	[1:2, 1:2]	2 17	0 -2	

Files Plots Packages Help Viewer Presentation

Folder File Delete Rename

Home > matematicas naticiales > SCRIP

	Name	Size	Modified
	..		
	1) SA.R	519 B	Feb 28, 2025, 2:50 AM
	2) 2A + BC.R	546 B	Feb 28, 2025, 3:07 AM
	3) 3A - 4 B.R	591 B	Feb 28, 2025, 2:25 AM
	4) B - 2C.R	554 B	Feb 28, 2025, 2:34 AM
	5) 2A + (B-C).R	595 B	Feb 28, 2025, 2:46 AM
	CREACIÓN DE MATRICES A,B,C.R	472 B	Mar 1, 2025, 10:38 PM
	CREACION DE MATRIZ # 2.R	554 B	Mar 1, 2025, 10:54 PM

Activar Windows
Ve a Configuración para activar Windows.

18°C 11:00 p. m. 01/03/2025

2) $B * C$

The screenshot displays the RStudio interface with the following components:

- Source Editor:** Contains R code for creating and multiplying matrices. The code is as follows:

```
24  
25  
26 matrizC <- matrix(nrow = 2, ncol = 2)  
27  
28 matrizC[1, 1] <- 1  
29 matrizC[1, 2] <- 3  
30 matrizC[2, 1] <- -4  
31 matrizC[2, 2] <- 2  
32  
33 matrizC  
34  
35 multiplicación <- matrizB %% matrizC  
36 multiplicación
```
- Console:** Shows the execution output of the code:

```
[3,] 5 -2  
> matrizC <- matrix(nrow = 2, ncol = 2)  
>  
> matrizC[1, 1] <- 1  
> matrizC[1, 2] <- 3  
> matrizC[2, 1] <- -4  
> matrizC[2, 2] <- 2  
>  
> matrizC  
      [,1] [,2]  
[1,]  1    3  
[2,] -4    2  
> multiplicación <- matrizB %% matrizC  
> multiplicación  
      [,1] [,2]  
[1,] -9    1  
[2,]  1    3  
[3,] 13   11  
> |
```
- Environment:** Lists the objects in the global environment:

Object	Class	Dimensions	Values
matrizB	num	[1:3, 1:2]	-1 1 5 2 0 -2
matrizC	num	[1:2, 1:2]	1 -4 3 2
multiplicaci...	num	[1:3, 1:2]	-9 1 13 1 3 11
- Files:** Shows a file explorer view of the project directory, listing files such as 1) 5A.R, 2) 2A + BC.R, 3) 3A - 4 B.R, 4) B - 2C.R, 5) 2A + (B-C).R, CREACIÓN DE MATRICES A,B,C.R, CREACION DE MATRIZ # 2 A, B, C.R, and F 1-A x B.R.

3) $C \cdot A$

The screenshot displays the RStudio interface with the following components:

- Source Editor:** Contains R code for creating two matrices and performing their multiplication.

```
26 matrizC <- matrix(nrow = 2, ncol = 2)
27
28 matrizC[1, 1] <- 1
29 matrizC[1, 2] <- 3
30 matrizC[2, 1] <- -4
31 matrizC[2, 2] <- 2
32
33 matrizC
34
35 multiplicación <- matrizC %% matrizA
36 multiplicación
37
38
```
- Console:** Shows the execution of the code, including the creation of `matrizA` and the result of the multiplication `matrizC %% matrizA`.

```
> matrizA <- matrix(nrow = 2, ncol = 3)
>
> matrizA[1, 1] <- 1
> matrizA[1, 2] <- -2
> matrizA[1, 3] <- 1
> matrizA[2, 1] <- 3
> matrizA[2, 2] <- 0
> matrizA[2, 3] <- 4
>
> matrizA
  [,1] [,2] [,3]
[1,]   1  -2   1
[2,]   3   0   4
> multiplicación <- matrizC %% matrizA
> multiplicación
  [,1] [,2] [,3]
[1,]  10  -2  13
[2,]   2   8   4
>
```
- Environment:** Lists the objects in the global environment: `matrizA` (numeric matrix 2x3), `matrizC` (numeric matrix 2x2), and `multiplicación` (numeric matrix 2x3).
- Files:** Shows a file explorer view with a list of files and folders, including `1) 5A.R`, `2) 2A + B.C.R`, `3) 3A - 4 B.R`, `4) B - 2C.R`, `5) 2A + (B-C).R`, `CREACIÓN DE MATRICES A,B,C.R`, `CREACION DE MATRIZ # 2 A, B, C.R`, and `F 1-A x B.R`.

2) Sean las matrices:

$$A = \begin{bmatrix} 1 & -2 & 1 \\ 3 & 0 & 4 \end{bmatrix}$$

$$B = \begin{bmatrix} -1 & 2 \\ 1 & 0 \\ 5 & -2 \end{bmatrix}$$

$$C = \begin{bmatrix} 1 & 3 \\ -4 & 2 \end{bmatrix}$$

Ejecutar las siguientes operaciones:

1) $A * B$ 2) $B * C$ 3) $C * A$:

$$1) \quad A = \begin{bmatrix} 1 & -2 & 1 \\ 3 & 0 & 4 \end{bmatrix} * B = \begin{bmatrix} -1 & 2 \\ 1 & 0 \\ 5 & -2 \end{bmatrix} \quad \begin{array}{l} (-1 + -2 = -3 + 5 = 2) \\ (1 * -1 + -2 * 1 + 1 * 5) \\ (3 * -1 + 0 * 1 + 4 * 5) \\ (5 * -2) \end{array}$$

$$\begin{array}{l} 2 + -0 = -2 + -2 = 0 \\ (1 * 2 + -2 * 0 + 1 * -2) \\ (3 * 2 + 0 * 0 + 4 * -2) \\ 6 + 0 = 6 + -8 = -2 \end{array} \quad R = \begin{bmatrix} 2 & 0 \\ 17 & -2 \end{bmatrix}$$

$$2) \quad B = \begin{bmatrix} -1 & 2 \\ 1 & 0 \\ 5 & -2 \end{bmatrix} * C = \begin{bmatrix} 1 & 3 \\ -4 & 2 \end{bmatrix} = \begin{bmatrix} (-1 + -6) & (-3 + 4) \\ (1 + 0) & (3 + 0) \\ (5 + -8) & (-15 + -4) \end{bmatrix} = \begin{bmatrix} -7 & 1 \\ 1 & 3 \\ -3 & -19 \end{bmatrix} \quad R = \begin{bmatrix} -7 & 1 \\ 1 & 3 \\ -3 & -19 \end{bmatrix}$$

$$3) \quad C = \begin{bmatrix} 1 & 3 \\ -4 & 2 \end{bmatrix} * A = \begin{bmatrix} 1 & -2 & 1 \\ 3 & 0 & 4 \end{bmatrix} = \begin{array}{l} (-1 + 9) (-2 + 0) (1 + 12) = \\ (-4 + 6) (8 + 0) (-4 + 8) = \end{array}$$

$$R = \begin{bmatrix} 10 & -2 & 13 \\ 2 & 8 & 4 \end{bmatrix}$$

4.3 Matriz 3

3) Sean las matrices:

$$A = \begin{bmatrix} 2 & 3 \\ 6 & 7 \\ 8 & 7 \end{bmatrix}$$

$$B = \begin{bmatrix} 2 & 3 & 5 & 7 & -1 \\ 1 & -1 & 0 & 4 & 3 \end{bmatrix}$$

Ejecutar las siguientes operaciones: 1) A^T 2) B^T 3) $B^T \cdot A$ 4) $A^T \cdot B$

The screenshot shows the RStudio interface with the following content:

Source Editor:

```
1 # Crear una matriz de 2x2 vacía y asignar valores específicos
2 matrizA <- matrix(nrow = 3, ncol = 2)
3
4 matrizA[1, 1] <- 2
5 matrizA[1, 2] <- 3
```

Console:

```
> matrizA[3, 2] <- 7
> matrizA
     [,1] [,2]
[1,]    2    3
[2,]    6    7
[3,]    8    7
>
> matrizB <- matrix(nrow = 2, ncol = 5)
> matrizB[1, 1] <- 2
> matrizB[1, 2] <- 3
> matrizB[1, 3] <- 5
> matrizB[1, 4] <- 7
> matrizB[1, 5] <- -1
> matrizB[2, 1] <- 1
> matrizB[2, 2] <- -1
> matrizB[2, 3] <- 0
> matrizB[2, 4] <- 4
> matrizB[2, 5] <- 3
>
> matrizB
     [,1] [,2] [,3] [,4] [,5]
[1,]    2    3    5    7   -1
[2,]    1   -1    0    4    3
>
```

Environment:

Object	Class	Attributes
matrizA	num	[1:3, 1:2] 2 6 8 3 7 7
matrizB	num	[1:2, 1:5] 2 1 3 -1 5 0 7 4 -...

Files:

Name	Size	Modified
1) 5A.R	519 B	Feb 28, 2025, 2:50 AM
2) 2A + B.C.R	546 B	Feb 28, 2025, 3:07 AM
3) 3A - 4 B.R	591 B	Feb 28, 2025, 2:25 AM
4) B - 2C.R	554 B	Feb 28, 2025, 2:34 AM
5) 2A + (B-C).R	595 B	Feb 28, 2025, 2:46 AM
CREACIÓN DE MATRICES A,B,C.R	472 B	Mar 1, 2025, 10:38 PM
CREACION DE MATRIZ # 2 A, B, C.R	554 B	Mar 1, 2025, 10:54 PM
F 1-A x B.R	615 B	Mar 1, 2025, 11:11 PM

System Tray: 16°C, 12:25 a.m., 02/03/2025

1) AT

The screenshot displays the RStudio environment with the following components:

- Source Editor:** Contains R code for creating a matrix and its transpose.

```
1 matrizA[1, 1] <- 2
2 matrizA[1, 2] <- 3
3 matrizA[2, 1] <- 6
4 matrizA[2, 2] <- 7
5 matrizA[3, 1] <- 8
6 matrizA[3, 2] <- 7
7
8 matrizA
9
10 matrizA
11
12 matriz_transpuesta <- t(matrizA)
13 matriz_transpuesta
```
- Console:** Shows the execution of the code and the resulting matrix output.

```
> matrizA[3, 1] <- 8
> matrizA[3, 2] <- 7
> matrizA
      [,1] [,2]
[1,]    2    3
[2,]    6    7
[3,]    8    7
> matrizA
      [,1] [,2]
[1,]    2    3
[2,]    6    7
[3,]    8    7
> matriz_transpuesta <- t(matrizA)
> matriz_transpuesta
      [,1] [,2] [,3]
[1,]    2    6    8
[2,]    3    7    7
```
- Environment:** Lists the objects in the Global Environment.

Object	Class	Attributes
matriz_trans...	num	[1:2, 1:3] 2 3 6 7 8 7
matrizA	num	[1:3, 1:2] 2 6 8 3 7 7
- Files:** Shows a file explorer view of the project directory, listing files like 1) 5A.R, 2) 2A + B.C.R, etc.

2) BT

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

```
1 # Crear una matriz de 2x2 vacía y asignar valores específicos
2 matrizB <- matrix(nrow = 2, ncol = 5)
3
4 matrizB[1, 1] <- 2
5 matrizB[1, 2] <- 3
6 matrizB[1, 3] <- 5
7 matrizB[1, 4] <- 7
8 matrizB[1, 5] <- -1
9 matrizB[2, 1] <- 1
10 matrizB[2, 2] <- -1
11 matrizB[2, 3] <- 0
12 matrizB[2, 4] <- 4
13 matrizB[2, 5] <- 3
14
15 matrizB
16
17 matrizB
18 matriz_transpuesta <- t(matrizB)
19 matriz_transpuesta
20
```

Console

```
R - R 4.4.2 - ~/
[1,] [2,] [3,] [4,] [5,]
[1,] 2 3 5 7 -1
[2,] 1 -1 0 4 3
> matriz_transpuesta <- t(matrizB)
> matriz_transpuesta
[1,] [2,]
[1,] 2 1
[2,] 3 -1
[3,] 5 0
[4,] 7 4
[5,] -1 3
> |
```

Environment

Global Environment

Data

matriz_trans...	num	[1:5, 1:2]	2	3	5	7	-1	1	-1
matrizA	num	[1:3, 1:2]	2	6	8	3	7	7	
matrizB	num	[1:2, 1:5]	2	1	3	-1	5	0	7

Files

matemáticas natriciales > SCRIP

Name	Size	Modified
1) 5A.R	519 B	Feb 28, 2025, 2:50 AM
2) 2A + BC.R	546 B	Feb 28, 2025, 3:07 AM
3) 3A - 4B.R	591 B	Feb 28, 2025, 2:25 AM
4) B - 2C.R	554 B	Feb 28, 2025, 2:34 AM
5) 2A + (B-C).R	595 B	Feb 28, 2025, 2:46 AM
CREACIÓN DE MATRICES A,B,C.R	472 B	Mar 1, 2025, 10:38 PM
CREACIÓN DE MATRIZ # 2 A, B, C.R	554 B	Mar 1, 2025, 10:54 PM
F 1-A x B.R	615 B	Mar 1, 2025, 11:11 PM

Activar Windows

Ve a Configuración para activar Windows.

3) $BT * A$

The screenshot shows the RStudio interface with the following components:

- Source Editor:** Contains R code defining matrices and attempting operations. Lines 34 and 35 are highlighted in blue.
- Environment:** Shows variables `matrizA` and `matrizB` as numeric matrices.
- Console:** Shows the execution of `matriz_transpuesta` and `multiplicación_transpuesta`, followed by errors for `escalar`.

Source Editor Code:

```
17 matrizB[1, 2] <- 3
18 matrizB[1, 3] <- 5
19 matrizB[1, 4] <- 7
20 matrizB[1, 5] <- -1
21 matrizB[2, 1] <- 1
22 matrizB[2, 2] <- -1
23 matrizB[2, 3] <- 0
24 matrizB[2, 4] <- 4
25 matrizB[2, 5] <- 3
26
27 matrizB
28
29 matriz_transpuesta <- t(matrizB)
30 matriz_transpuesta
31
32 multiplicación_transpuesta <- t(matrizB)%% matrizA
33 multiplicación
34 escalar <- t(matrizB) * matrizA
35 escalar
36
```

Environment Data:

Variable	Class	Dimensions	Values
matriz_transpuesta	num	[1:5, 1:2]	2 3 5 7 -1 -1 0 ...
matrizA	num	[1:3, 1:2]	2 6 8 3 7 7
matrizB	num	[1:2, 1:5]	2 1 3 -1 5 0 7 4 -...

Console Output:

```
> matriz_transpuesta
[,1] [,2]
[1,] 2 1
[2,] 3 -1
[3,] 5 0
[4,] 7 4
[5,] -1 3
> multiplicación_transpuesta <- t(matrizB)%% matrizA
Error en t(matrizB) %% matrizA: argumentos no compatibles
> escalar <- t(matrizB) * matrizA
Error en t(matrizB) * matrizA: arreglos de dimensión no compatibles
>
```

NO SE PUEDE REALIZAR MULTIPLICACION DE $BT * A$, YA QUE EL NUMERO DE COLUMNAS DE LA MATRIZ BT NO ES IGUAL AL NUMERO DE FILAS DE LA MATRIZ A.

4) $AT * B$

The screenshot shows the RStudio interface. The script editor contains the following code:

```
19 matrizB[1, 3] <- 5
20 matrizB[1, 4] <- 7
21 matrizB[1, 5] <- -1
22 matrizB[2, 1] <- 1
23 matrizB[2, 2] <- -1
24 matrizB[2, 3] <- 0
25 matrizB[2, 4] <- 4
26 matrizB[2, 5] <- 3
27
28 matrizB
29
30
31 matriz_transpuesta <- t(matrizA)
32 matriz_transpuesta
33
34 multiplicación_transpuesta <- t(matrizA)%% matrizB
35 multiplicación
36 escalar <- t(matrizB) * matrizA
37 escalar
38
```

The console shows the following output and errors:

```
[1,] 2 3 5 7 -1
[2,] 1 -1 0 4 3
> matriz_transpuesta <- t(matrizA)
> matriz_transpuesta
[,1] [,2] [,3]
[1,] 2 6 8
[2,] 3 7 7
> multiplicación_transpuesta <- t(matrizA)%% matrizB
Error en t(matrizA) %% matrizB: argumentos no compatibles
> escalar <- t(matrizB) * matrizA
Error en t(matrizB) * matrizA: arreglos de dimensión no compatibles
> |
```

The Environment pane shows the following objects:

Object	Class	Dimensions	Values
matriz_trans...	num	[1:2, 1:3]	2 3 6 7 8 7
matrizA	num	[1:3, 1:2]	2 6 8 3 7 7
matrizB	num	[1:2, 1:5]	2 1 3 -1 5 0 7 4 -...

The Files pane shows the following files:

Name	Size	Modified
1) 5A.R	519 B	Feb 28, 2025, 2:50 AM
2) 2A + BC.R	546 B	Feb 28, 2025, 3:07 AM
3) 3 A - 4 B.R	591 B	Feb 28, 2025, 2:25 AM
4) B - 2C.R	554 B	Feb 28, 2025, 2:34 AM
5) 2A + (B-C).R	595 B	Feb 28, 2025, 2:46 AM
CREACIÓN DE MATRICES # 3 A, B, R	497 B	Mar 2, 2025, 12:18 AM
CREACIÓN DE MATRICES A,B,C,R	472 B	Mar 1, 2025, 10:38 PM
CREACIÓN DE MATRIZ # 2 A, B, C, R	554 B	Mar 3, 2025, 10:38 PM
F 1-A x B.R	615 B	Mar 1, 2025, 11:11 PM
F 2- B x C.R	610 B	Mar 1, 2025, 11:40 PM
F 3- C x A.R	614 B	Mar 1, 2025, 11:56 PM
T 1.- AT.R	560 B	Mar 2, 2025, 12:21 AM
T 2.- BT.R	384 B	Mar 2, 2025, 12:29 AM

NO SE PUEDE REALIZAR MULTIPLICACION DE $AT * B$, YA QUE EL NUMERO DE COLUMNAS DE LA MATRIZ AT NO ES IGUAL AL NUMERO DE FILAS DE LA MATRIZ B.

3) Sean las matrices:

$$A = \begin{bmatrix} 2 & 3 \\ 6 & 7 \\ 8 & 7 \end{bmatrix}$$

$$B = \begin{bmatrix} 2 & 3 & 5 & 7 & -1 \\ 1 & -1 & 0 & 4 & 3 \end{bmatrix}$$

Ejecutar las siguientes operaciones:

1) A^T 2) B^T 3) $B^T * A$ 4) $A^T * B$

$$1) A = \begin{bmatrix} 2 & 3 \\ 6 & 7 \\ 8 & 7 \end{bmatrix} = A^T = \begin{bmatrix} 2 & 6 & 8 \\ 3 & 7 & 7 \end{bmatrix}$$

$$2) B = \begin{bmatrix} 2 & 3 & 5 & 7 & -1 \\ 1 & -1 & 0 & 4 & 3 \end{bmatrix} = B^T = \begin{bmatrix} 2 & 1 \\ 3 & -1 \\ 5 & 0 \\ 7 & 4 \\ -1 & 3 \end{bmatrix}$$

$$3) B = \begin{bmatrix} 2 & 3 & 5 & 7 & -1 \\ 1 & -1 & 0 & 4 & 3 \end{bmatrix} = B^T = \begin{bmatrix} 2 & 1 \\ 3 & -1 \\ 5 & 0 \\ 7 & 4 \\ -1 & 3 \end{bmatrix} * A = \begin{bmatrix} 2 & 3 \\ 6 & 7 \\ 8 & 7 \end{bmatrix} = X$$

No se puede realizar

multiplicación por que

el número de columnas no es

$$\begin{matrix} F & C & R & C \\ - & 2 \times 5 & 3 \times 2 \\ & \underbrace{\quad\quad} & 1 \end{matrix}$$

$$4) A = \begin{bmatrix} 2 & 3 \\ 6 & 7 \\ 8 & 7 \end{bmatrix} = A^T = \begin{bmatrix} 2 & 6 & 8 \\ 3 & 7 & 7 \end{bmatrix} * B = \begin{bmatrix} 2 & 3 & 5 & 7 & -1 \\ 1 & -1 & 0 & 4 & 3 \end{bmatrix} = X$$

el mismo que las

filas.

$$F \quad C$$

$$2 \times 3$$

$$F \quad C$$

$$2 \times 5$$

5 Conclusión

En esta actividad aprendimos a crear matrices y también a resolver estas mismas matrices en el programa RStudio, lo cual esta herramienta es una gran ayuda a conseguir los resultados de dichas matrices a consultar.

6 REFERENCIAS

Video conferencing, web conferencing, online meetings, screen sharing - Zoom. (s. f.-b). <https://academiaglobal-mx.zoom.us/>

Video conferencing, web conferencing, online meetings, screen sharing - Zoom. (s. f.).
<https://academiaglobal-mx.zoom.us/>

<https://github.com/31370493a/Alexis-ZAPATA-Matem-ticas-Matriciales.git>