TAREA 6. BASES

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Ejercicio 1. *Sea la aplicación* $f : \mathbb{R}^2 \to \mathbb{R}^2$ *tal que*

$$M_{B'B}(f) = \left[\begin{array}{cc} -2 & 2 \\ -1 & 1 \end{array} \right],$$

siendo B' *y* B *las bases dadas por las matrices*

$$B' = \left[\begin{array}{cc} 6 & -5 \\ 5 & -4 \end{array} \right] \text{ y } B = \left[\begin{array}{cc} -1 & -5 \\ 2 & 9 \end{array} \right].$$

Calcula $M(f)$.

Para resolver el problema puedes usar el siguiente esquema de diagrama:

$$\begin{tikzcd}
\mathbb{R}^a_A \arrow[r, "r", "M(r)"'] \arrow[rrr, bend right, "u", "M(u)"'] & \mathbb{R}^b_B \arrow[r, "s", "M(s)"'] & \mathbb{R}^c_C \arrow[r, "t", "M(t)"'] & \mathbb{R}^d_D
\end{tikzcd}$$

Solución:

```
MBpB = matrix(QQ, [[-2, 2], [-1, 1]])
Bp = matrix(QQ, [[6, -5], [5, -4]])
B = matrix(QQ, [[-1, -5], [2, 9]])
BpB = Bp * B
Bi = B.inverse()
M = Bi * BpB * Bp
```

Multiplicamos B' y B para obtener

$$\begin{pmatrix} 6 & -5 \\ 5 & -4 \end{pmatrix} * \begin{pmatrix} -1 & -5 \\ 2 & 9 \end{pmatrix} = \begin{pmatrix} -16 & -75 \\ -13 & -61 \end{pmatrix}$$

Luego invertimos B

$$\begin{pmatrix} -1 & -5 \\ 2 & 9 \end{pmatrix} \to \begin{pmatrix} 9 & 5 \\ -2 & -1 \end{pmatrix}$$

Multiplicamos B inversa, B', B y B'

$$\begin{pmatrix} 9 & 5 \\ -2 & -1 \end{pmatrix} * \begin{pmatrix} 6 & -5 \\ 5 & -4 \end{pmatrix} * \begin{pmatrix} -1 & -5 \\ 2 & 9 \end{pmatrix} * \begin{pmatrix} 6 & -5 \\ 5 & -4 \end{pmatrix} \rightarrow \begin{pmatrix} -6154 & 4965 \\ 1325 & -1069 \end{pmatrix}$$