

$r = \vec{x}^i \vec{1}_i \equiv x\vec{i} + y\vec{j}$  Casos donde las componentes de  $r$  transforman como verdaderas componentes de vectores.

$$1. (x, y) \rightarrow (-y, x)$$

$$3. (x, y) \rightarrow (x-y, x+y)$$

$$2. (x, y) \rightarrow (x, -y)$$

$$4. (x, y) = (x+y, x-y)$$

Matriz A.

$$1. (x, y) \rightarrow (-y, x)$$

$$\begin{matrix} \vec{x} \\ \vec{y} \end{matrix} = (0)(N) + (-1)(y) \rightarrow \begin{pmatrix} \vec{x} \\ \vec{y} \end{pmatrix} = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix}$$

$$2. (x, y) \rightarrow (x, -y)$$

$$\text{Luego, matriz asociada } A = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix} \quad A^T = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$$

Multiplicamos y si da como resultado  $A \cdot A^T = I$  si cumple! (criterio que aplica siempre).

$$AA^T = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix} \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$$

Se cumple!

$$2. (x, y) \rightarrow (x, -y)$$

$$\vec{x} = (1)(N) + (0)(y)$$

$$\vec{y} = (0)(N) + (-1)(y)$$

$$A = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix} \quad A^T = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$$

$$AA^T = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix} \cdot \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$$

Se cumple!

$$3. (x, y) \rightarrow (x-y, x+y)$$

$$A = \begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix} \quad A^T = \begin{pmatrix} 1 & 1 \\ -1 & 1 \end{pmatrix}$$

$$\vec{x} = (1)(N) + (-1)(y)$$

$$\vec{y} = (1)(N) + (1)(y)$$

$$AA^T = \begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix} \begin{pmatrix} 1 & 1 \\ -1 & 1 \end{pmatrix} = \begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$$

No es la identidad,  $2I$ .

No cumple!

4.

$$(x, y) \rightarrow (x+y, x-y).$$

$$= C(x) + C(y)$$

$$A = \begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}, A^T = \begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}$$

$$= C(x) + C(-y).$$

$$AA^T = \begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$$

No Complet.