Ch 7.2 Matrices

$\longrightarrow$ Not commutative ($T_1 \times T_2 \neq T_2 \times T_1$)

$$x' = ax + by \qquad \begin{bmatrix} x' \\ y' \end{bmatrix} = \begin{bmatrix} a & b \\ c & d \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix}$$
$$y' = xc + dy$$

$$x'' = (Aa + Bc)x + (Ab + Bd)y \qquad \begin{bmatrix} x'' \\ y'' \end{bmatrix} = \begin{bmatrix} A & B \\ C & D \end{bmatrix} \cdot \begin{bmatrix} a & b \\ c & d \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix}$$
$$y'' = (Ca + Dc)x + (Cb + Dd)y$$

Systems of Notation

Column Vector Notation

Above

Row Vector Notation

$$\begin{bmatrix} x' & y' \end{bmatrix} = \begin{bmatrix} x & y \end{bmatrix} \cdot \begin{bmatrix} a & c \\ b & d \end{bmatrix}$$

The Determinant of a Matrix

$\longrightarrow$ Scalar quantity

The determinant of $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ is $\begin{vmatrix} a & b \\ c & d \end{vmatrix}$ which is $ad - cb$.

▼ Example

The determinant of $\begin{bmatrix} 3 & 2 \\ 1 & 2 \end{bmatrix}$ is $3 \times 2 - 1 \times 2 = 4$.