Exemple

$A = \begin{pmatrix} 2 & 0 \\ 1 & 1 \\ 0 & 3 \end{pmatrix}$ (3×2) $\quad B = \begin{pmatrix} 6 & -1 \\ -2 & 3 \end{pmatrix}$ (2×2) $\quad AB \in \mathcal{M}_{3\times 2}(\mathbb{R})$

1) $AB = A(\vec{b_1}\ \vec{b_2}) = A\left(\begin{array}{c|c} 6 & -1 \\ -2 & 3 \end{array}\right)$

$= \left(A\begin{pmatrix} 6 \\ -2 \end{pmatrix} \middle| A\begin{pmatrix} -1 \\ 3 \end{pmatrix}\right) = \left(\begin{array}{c|c} 12 & -2 \\ 4 & 2 \\ -6 & 9 \end{array}\right)$

2) $A = \begin{pmatrix} \ell_1(A) \\ \ell_2(A) \\ \ell_3(A) \end{pmatrix} = \begin{pmatrix} 2 & 0 \\ 1 & 1 \\ 0 & 3 \end{pmatrix}$

$AB = \begin{pmatrix} \ell_1(A)\,B \\ \vdots \\ \ell_3(A)\,B \end{pmatrix} = \begin{pmatrix} (2\ 0)\begin{pmatrix} 6 & -1 \\ -2 & 3 \end{pmatrix} \\ (1\ 1)\begin{pmatrix} 6 & -1 \\ -2 & 3 \end{pmatrix} \\ (0\ 3)\begin{pmatrix} 6 & -1 \\ -2 & 3 \end{pmatrix} \end{pmatrix}$

$= \begin{pmatrix} 12 & -2 \\ 4 & 2 \\ -6 & 9 \end{pmatrix}$

3) $A = \left(\begin{array}{c} 2\ 0 \\ \hline 1\ 1 \\ \hline 0\ 3 \end{array}\right)$ $\quad B = \left(\begin{array}{c|c} 6 & -1 \\ -2 & 3 \end{array}\right)$ produit "ligne · colonne"

$AB = \begin{pmatrix} (2\ 0)\begin{pmatrix} 6 \\ -2 \end{pmatrix} & (2\ 0)\begin{pmatrix} -1 \\ 3 \end{pmatrix} \\ (1\ 1)\begin{pmatrix} 6 \\ -2 \end{pmatrix} & (1\ 1)\begin{pmatrix} -1 \\ 3 \end{pmatrix} \\ (0\ 3)\begin{pmatrix} 6 \\ -2 \end{pmatrix} & (0\ 3)\begin{pmatrix} -1 \\ 3 \end{pmatrix} \end{pmatrix} = \begin{pmatrix} 12 & -2 \\ 4 & 2 \\ -6 & 9 \end{pmatrix}$

4) $A = \left(\begin{array}{c|c} 2 & 0 \\ 1 & 1 \\ 0 & 3 \end{array}\right)$ $\quad B = \left(\begin{array}{c} 6\ -1 \\ \hline -2\ 3 \end{array}\right)$

$AB = \begin{pmatrix} 2 \\ 1 \\ 0 \end{pmatrix}(6\ -1) + \begin{pmatrix} 0 \\ 1 \\ 3 \end{pmatrix}(-2\ 3)$

$$= \begin{pmatrix} 12 & -2 \\ 6 & -1 \\ 0 & 0 \end{pmatrix} + \begin{pmatrix} 0 & 0 \\ -2 & 3 \\ -6 & 9 \end{pmatrix} = \begin{pmatrix} 12 & -2 \\ 4 & 2 \\ -6 & 9 \end{pmatrix}$$