$$P_{eB} = \begin{pmatrix} -2 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & -1 & -1 \end{pmatrix}$$

exemple:

$[M]_e = \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix} \Rightarrow [M]_B$ se trouve (1) en résolvant

$$\left(P_{eB} \mid [M]_e \right).$$

(2) en cherchant P_{eB}^{-1} : $[M]_B = P_{eB}^{-1} [M]_e$

(3) trouver P_{Be} en exprimant $[e_i]_B$.

illustration: $[M]_B = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$. $M = 1 \cdot b_1 + 2 \cdot b_2 + 3 b_3$

$$= \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} + 2 \begin{pmatrix} 0 & 1 \\ 0 & 1 \end{pmatrix} + 3 \begin{pmatrix} 0 & 1 \\ 0 & 0 \end{pmatrix} = \begin{pmatrix} 1 & 5 \\ 0 & 3 \end{pmatrix} \quad (*)$$

$$= 1 \begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix} + 5 \begin{pmatrix} 0 & 1 \\ 0 & 0 \end{pmatrix} + 3 \begin{pmatrix} 0 & 0 \\ 0 & 1 \end{pmatrix}.$$

$$[M]_e = P_{eB} [M]_B = \begin{pmatrix} -2 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & -1 & -1 \end{pmatrix} \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} = \begin{pmatrix} 1 \\ 1 \\ -5 \end{pmatrix}$$

$$M = 1 \underbrace{\begin{pmatrix} 0 & 0 \\ 0 & -1 \end{pmatrix}}_{e_1} + 1 \underbrace{\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}}_{e_2} + (-5) \underbrace{\begin{pmatrix} 0 & -1 \\ 0 & -1 \end{pmatrix}}_{e_3} = \begin{pmatrix} 1 & 5 \\ 0 & 3 \end{pmatrix} \quad (*)$$

$$[M]_B = \begin{pmatrix} 1 \\ 5 \\ 3 \end{pmatrix}$$