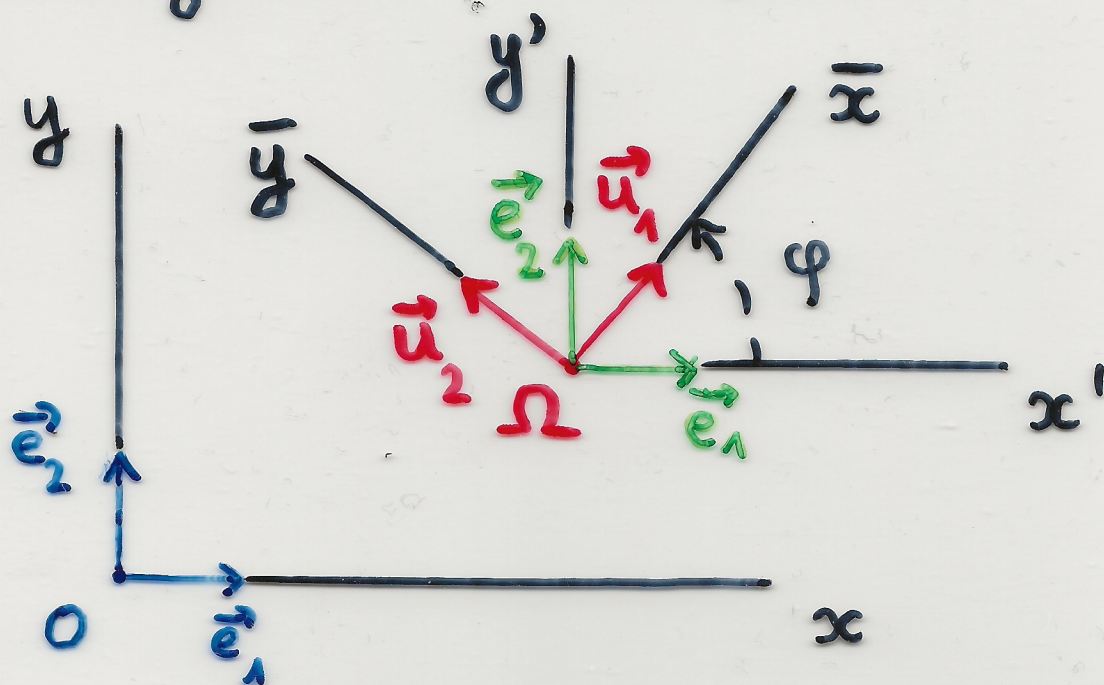


Changement de repère



$$U = \begin{pmatrix} \cos \varphi & -\sin \varphi & \alpha \\ \sin \varphi & \cos \varphi & \beta \\ 0 & 0 & 1 \end{pmatrix} = \begin{pmatrix} P_{2 \times 2} & T_{2 \times 1} \\ O_{1 \times 2} & 1 \end{pmatrix}$$

$$\cdot \det U = \det P = 1$$

$$\cdot P^{-1} = P^t$$

$$\cdot U^t = \begin{pmatrix} P^t & 0 \\ T^t & 1 \end{pmatrix}$$

$$\cdot \begin{cases} x = \cos \varphi \bar{x} - \sin \varphi \bar{y} + \alpha \\ y = \sin \varphi \bar{x} + \cos \varphi \bar{y} + \beta \end{cases} \Leftrightarrow$$

$$X = U \bar{X}, \quad X = \begin{pmatrix} x \\ y \\ 1 \end{pmatrix}, \quad \bar{X} = \begin{pmatrix} \bar{x} \\ \bar{y} \\ 1 \end{pmatrix}$$