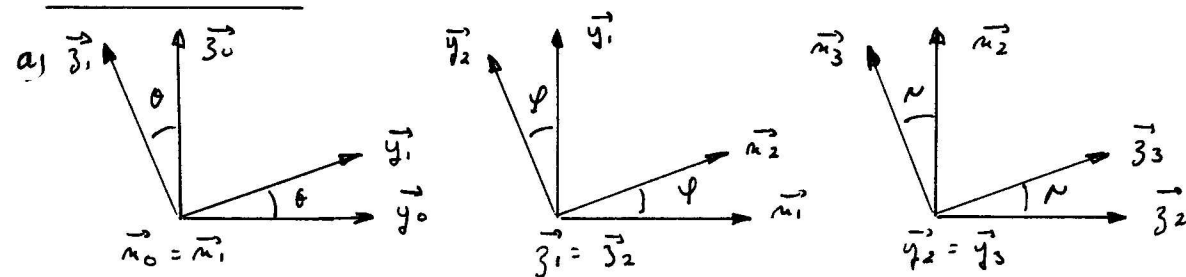


EXERCICE 1-6



b)

$$\begin{aligned}\vec{y}_1 &= \vec{y}_0 \\ \vec{y}_1 &= \cos \theta \vec{y}_0 + \sin \theta \vec{z}_0 \\ \vec{z}_1 &= -\sin \theta \vec{y}_0 + \cos \theta \vec{z}_0\end{aligned}$$

c)

$$\begin{aligned}\vec{y}_1 &= \cos \phi \vec{y}_2 - \sin \phi \vec{z}_2 \\ \vec{y}_1 &= \sin \phi \vec{y}_2 + \cos \phi \vec{z}_2 \\ \vec{z}_1 &= \vec{z}_2\end{aligned}$$

d)

$$\begin{aligned}\vec{y}_1 \cdot \vec{y}_2 &= \cos\left(\frac{3\pi}{2} + \phi\right) = \underline{\sin \phi} \\ \vec{y}_1 \cdot \vec{z}_2 &= \cos\left(\frac{\pi}{2} + \phi\right) = \underline{-\sin \phi} \\ \vec{y}_2 \cdot \vec{z}_3 &= \cos\left(\frac{3\pi}{2} + \nu\right) = \underline{\sin \nu} \\ \vec{z}_2 \cdot \vec{y}_3 &= \cos\left(\frac{\pi}{2} + \nu\right) = \underline{-\sin \nu}\end{aligned}$$

e)

$$\begin{aligned}\vec{z}_2 \wedge \vec{z}_3 &= \underline{\sin \nu \vec{y}_2} \\ \vec{y}_2 \wedge \vec{z}_3 &= \vec{y}_3 \wedge \vec{z}_3 = \underline{\vec{y}_3} \\ \vec{z}_2 \wedge \vec{y}_3 &= \sin\left(\frac{\pi}{2} + \nu\right) \vec{y}_2 = \underline{\cos \nu \vec{y}_2} \\ \vec{y}_2 \wedge \vec{y}_3 &= \sin\left(-\phi + \frac{3\pi}{2}\right) \vec{z}_1 = \underline{-\cos \phi \vec{z}_1}\end{aligned}$$

f)

$$\begin{aligned}\vec{y}_1 \wedge \vec{z}_3 &= (\cos \phi \vec{y}_2 - \sin \phi \vec{z}_2) \wedge \vec{z}_3 = \cos \phi (\vec{y}_2 \wedge \vec{z}_3) - \sin \phi (\vec{z}_2 \wedge \vec{z}_3) \\ &= \cos \phi \sin \nu \vec{y}_2 - \sin \phi \vec{y}_3 = \underline{-\cos \phi \cos \nu \vec{y}_2 - \sin \phi \vec{y}_3}\end{aligned}$$

ou

$$\vec{y}_1 \wedge \vec{z}_3 = \vec{y}_1 \wedge (\cos \nu \vec{z}_2 + \sin \nu \vec{y}_2) = \cos \nu \vec{y}_1 \wedge \vec{z}_2 + \sin \nu \vec{y}_1 \wedge \vec{y}_2$$

$$\begin{aligned}(\vec{z}_1 = \vec{z}_2) \Rightarrow &= \underline{-\cos \nu \vec{y}_1 + \sin \nu \sin \phi \vec{z}_1} = -\cos \nu (\cos \phi \vec{y}_2 + \sin \phi \vec{z}_2) + \sin \nu \sin \phi \vec{z}_2 = \\ &= -\cos \nu \cos \phi \vec{y}_2 - \cos \nu \sin \phi \vec{z}_2 + \sin \nu \sin \phi \vec{z}_2 \\ &= -\sin \phi (\cos \nu \vec{y}_2 - \sin \nu \vec{z}_2) - \cos \nu \cos \phi \vec{y}_2 = \underline{-\sin \phi \vec{y}_3 - \cos \phi \cos \nu \vec{y}_2}\end{aligned}$$

$$\vec{y}_1 \wedge \vec{y}_3 = \vec{y}_1 \wedge \vec{y}_2 = \underline{\sin \phi \vec{z}_1}$$

$$\vec{z}_2 \wedge \vec{z}_1 = \underline{\vec{0}}$$