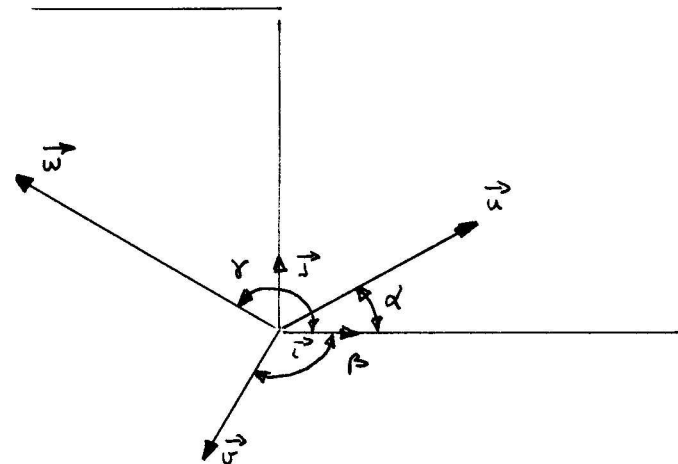


EXERCICE 1-5



$$\begin{aligned}\vec{u} &= \|\vec{u}\| (\cos \alpha \vec{i} + \sin \alpha \vec{j}) \\ &= 3 \left(\frac{\sqrt{3}}{2} \vec{i} + \frac{1}{2} \vec{j} \right) = \frac{3\sqrt{3}}{2} \vec{i} + \frac{3}{2} \vec{j} \\ \vec{v} &= \|\vec{v}\| (\cos \beta \vec{i} + \sin \beta \vec{j}) \\ &= 2 \left(-\frac{1}{2} \vec{i} - \frac{\sqrt{3}}{2} \vec{j} \right) = -\vec{i} - \sqrt{3} \vec{j} \\ \vec{w} &= \|\vec{w}\| (\cos \gamma \vec{i} + \sin \gamma \vec{j}) \\ &= 4 \left(-\frac{\sqrt{3}}{2} \vec{i} + \frac{1}{2} \vec{j} \right) = -2\sqrt{3} \vec{i} + 2 \vec{j}\end{aligned}$$

$$\Rightarrow \begin{cases} \vec{u} \left(\frac{3\sqrt{3}}{2}, \frac{3}{2}, 0 \right) \\ \vec{v} \left(-1, -\sqrt{3}, 0 \right) \\ \vec{w} \left(-2\sqrt{3}, 2, 0 \right) \end{cases}$$

$$\begin{aligned}\vec{a} \cdot \vec{b} &= \|\vec{a}\| \cdot \|\vec{b}\| \cos(\vec{a}, \vec{b}) \\ \vec{a} \wedge \vec{b} &= \|\vec{a}\| \cdot \|\vec{b}\| \sin(\vec{a}, \vec{b}) \vec{c}\end{aligned}$$

($\vec{c} \perp \vec{a}, \vec{b}$ sens direct.)

$$\begin{aligned}\vec{u} \cdot \vec{v} &= \|\vec{u}\| \cdot \|\vec{v}\| \cos(\vec{u}, \vec{v}) \\ &= 3 \cdot 2 \cos\left(-\frac{5\pi}{6}\right) = 3 \times 2 \times -\frac{\sqrt{3}}{2} = -3\sqrt{3} \quad \vec{u} \cdot \vec{v} = -3\sqrt{3}\end{aligned}$$

$$\begin{aligned}\vec{u} \cdot \vec{w} &= \|\vec{u}\| \cdot \|\vec{w}\| \cos(\vec{u}, \vec{w}) \\ &= 3 \cdot 4 \cos\left(\frac{4\pi}{6}\right) = 3 \times 4 \cdot -\frac{1}{2} = -6 \quad \vec{u} \cdot \vec{w} = -6\end{aligned}$$

$$\begin{aligned}\vec{v} \cdot \vec{w} &= \|\vec{v}\| \cdot \|\vec{w}\| \cos(\vec{v}, \vec{w}) \\ &= 2 \cdot 4 \cos\left(-\frac{\pi}{2}\right) = 2 \times 4 \times 0 = 0 \quad \vec{v} \cdot \vec{w} = 0\end{aligned}$$

$$\begin{aligned}\vec{u} \wedge \vec{v} &= \|\vec{u}\| \cdot \|\vec{v}\| \sin(\vec{u}, \vec{v}) \vec{k} \\ &= 3 \cdot 2 \sin\left(-\frac{5\pi}{6}\right) \vec{k} = 3 \cdot 2 \cdot -\frac{1}{2} \vec{k} = -3 \vec{k} \quad \vec{u} \wedge \vec{v} = -3 \vec{k}\end{aligned}$$

$$\begin{aligned}\vec{w} \wedge \vec{u} &= \|\vec{w}\| \cdot \|\vec{u}\| \sin(\vec{w}, \vec{u}) \vec{k} \\ &= 4 \cdot 3 \sin\left(-\frac{4\pi}{6}\right) \vec{k} = 4 \cdot 3 \cdot -\frac{\sqrt{3}}{2} \vec{k} = -6\sqrt{3} \vec{k} \quad \vec{w} \wedge \vec{u} = -6\sqrt{3} \vec{k}\end{aligned}$$

$$\begin{aligned}\vec{v} \wedge \vec{w} &= \|\vec{v}\| \cdot \|\vec{w}\| \sin(\vec{v}, \vec{w}) \vec{k} \\ &= 2 \cdot 4 \sin\left(-\frac{\pi}{2}\right) \vec{k} = 2 \cdot 4 \cdot -1 \vec{k} = -8 \vec{k} \quad \vec{v} \wedge \vec{w} = -8 \vec{k}\end{aligned}$$

$$\begin{cases} \vec{u} \cdot \vec{v} = -3\sqrt{3} & \vec{u} \wedge \vec{v} = -3 \vec{k} \\ \vec{u} \cdot \vec{w} = -6 & \vec{w} \wedge \vec{u} = -6\sqrt{3} \vec{k} \\ \vec{v} \cdot \vec{w} = 0 & \vec{v} \wedge \vec{w} = -8 \vec{k} \end{cases}$$