Dérivées

① $\cos(t)$

$-\sin(t)$

② $\sin(t)$

$\cos(t)$

③ $\tan(t)$

$\frac{1}{\cos(t)}$

④ $\ln(t)$

$\frac{1}{t}$

⑤ $\sqrt{t}$

$\frac{1}{2\sqrt{t}}$

⑥ $t^{\alpha} = \alpha x^{\alpha-1}$

⑦ $\sin(t)\cos(t)$

$\cos^2(t) - \sin^2(t)$

⑧ $\cos(t) - t\sin(t)$

⑨ $\frac{d(t\cos(t))}{dt}\sin(t)$

$+ (t\cos(t))\cos(t)$

$= (\cos(t) - t\sin(t))\sin(t)$
$+ t\cos^2(t)$

$= \cos(t)\sin(t) - t(\sin^2(t) - \cos^2(t))$

⑩ $2t\cos(t^2)$

Dérivatᵒ de fonctᵒ composée

① $-\omega \sin(\omega t)$

② $\omega \cos(\omega t)$

③ $\dfrac{\omega}{2\cos\left(\frac{\omega}{2}t\right)}$

④ $\sin(\omega t)\cos(\omega t)$

$= \omega\cos(\omega t)\cos(\omega t) - \sin(\omega t)^{\omega}\sin(\omega t)$

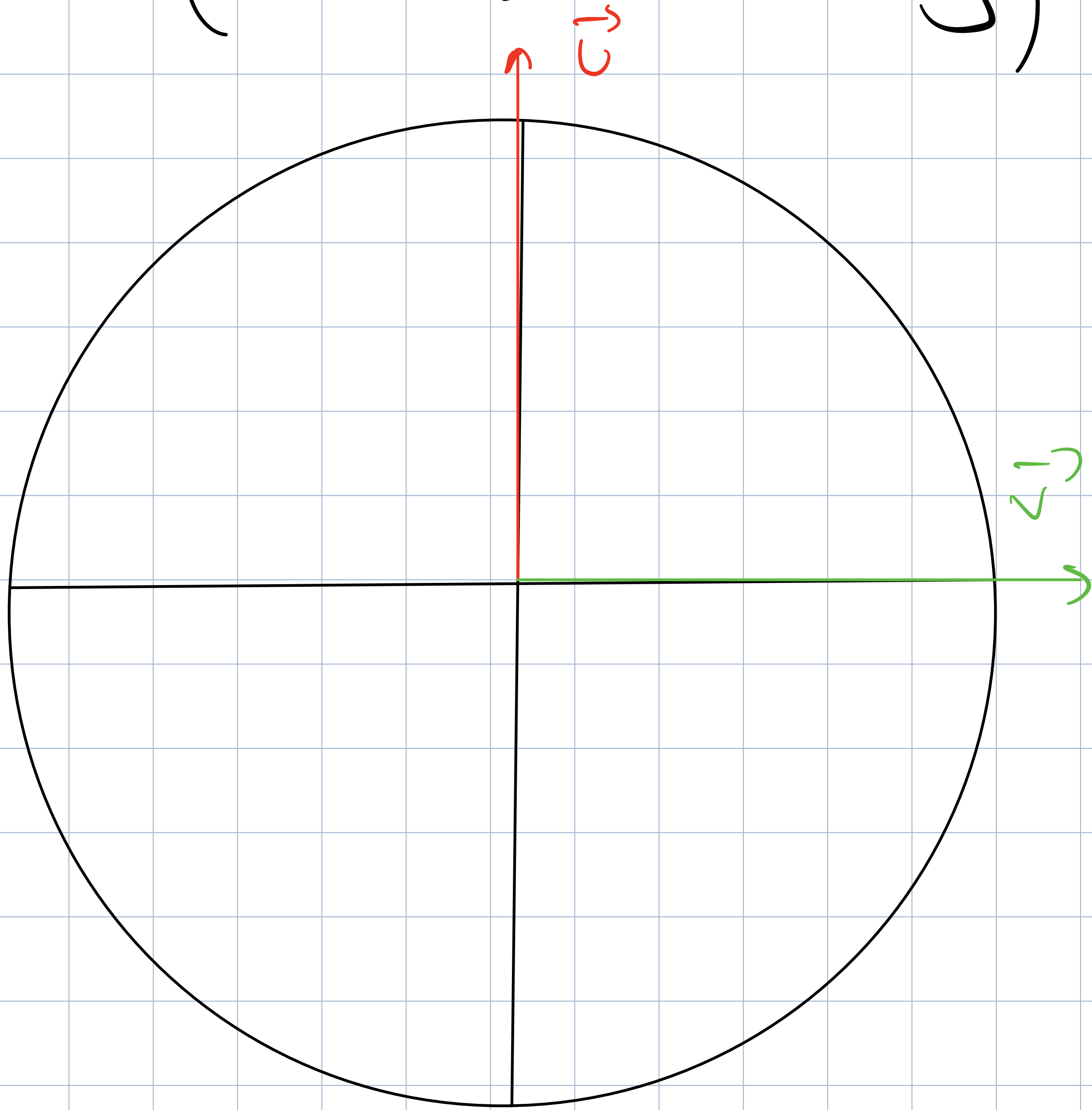
$= \omega\left(\cos^2(\theta) - \sin^2(\theta)\right)$

Vecteurs

(1) $\vec{OA} = R(\cos\theta \, \vec{x} + \sin\theta \, \vec{y})$

$\vec{OB} = R(-\cos\theta \, \vec{x} + \sin\theta \, \vec{y})$

(2)

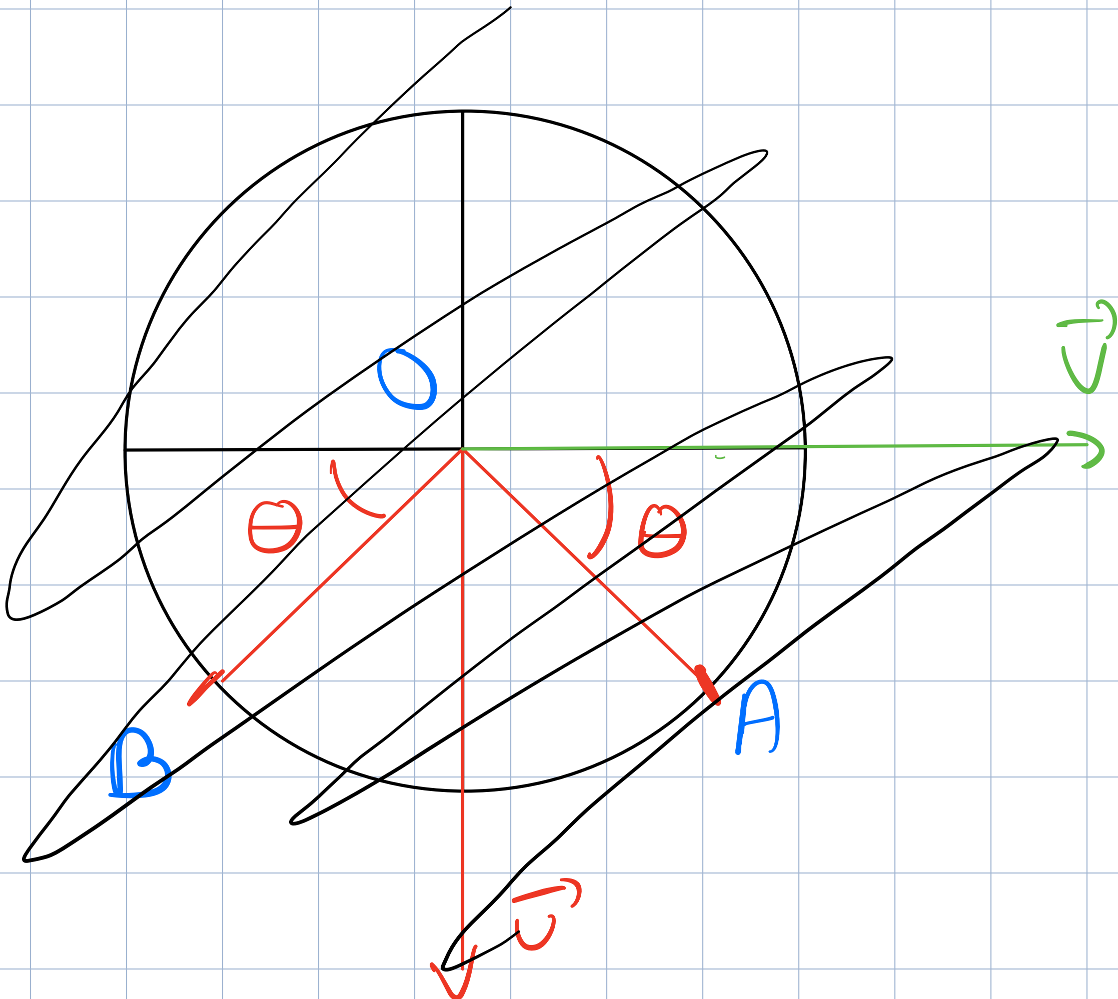


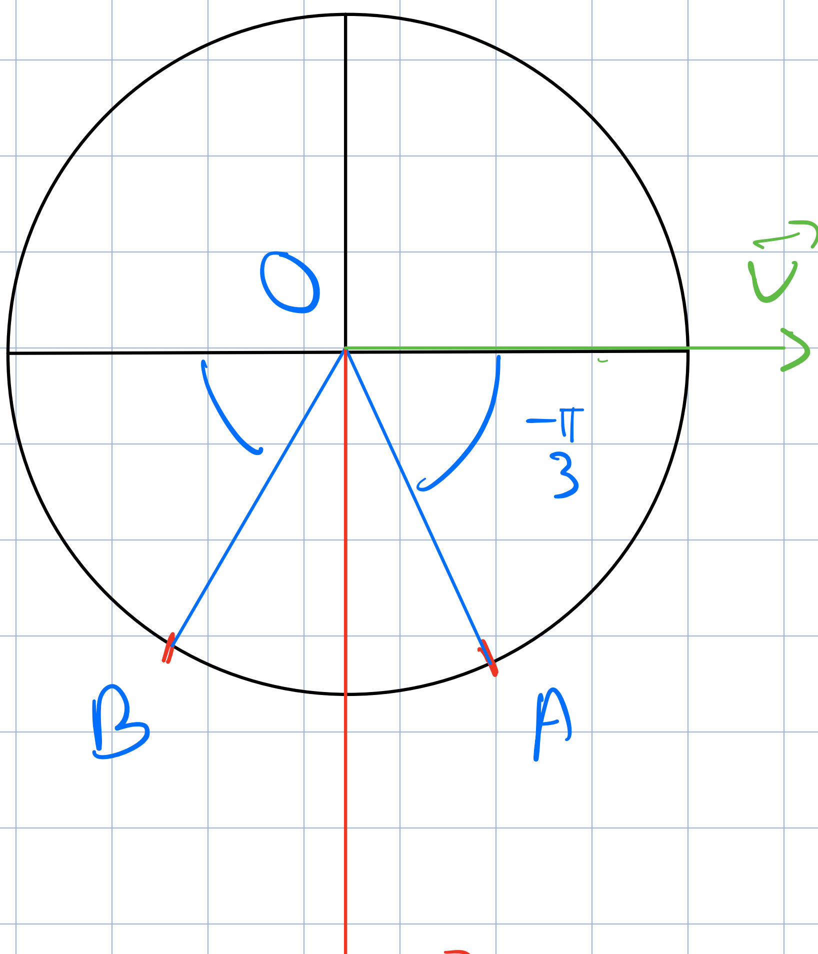
(3)

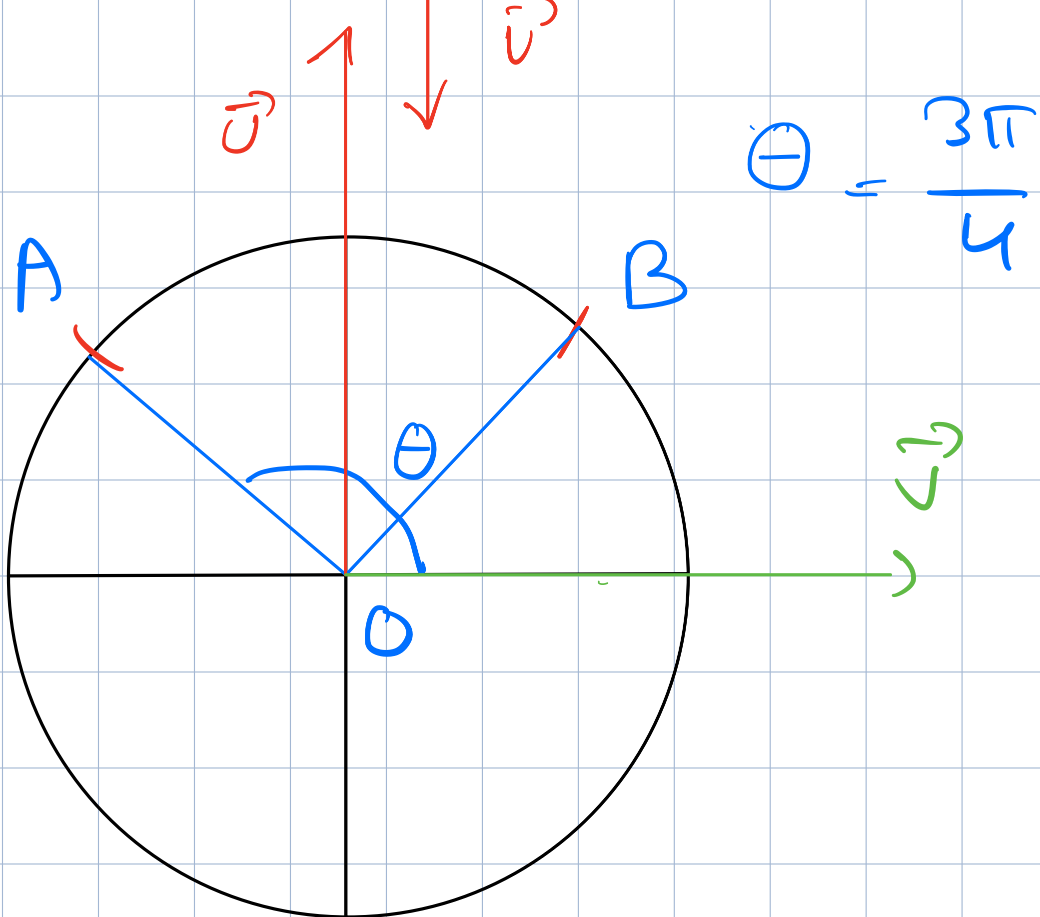
$\vec{u} = 2\sin\theta \, \vec{y}$

$\vec{v} = 2\cos\theta \, \vec{x}$

4







Desenho (2)

① $-\dot{\theta}\sin(\theta)$

② $\dot{\theta}\cos(\theta)$

③ $\dfrac{\dot{\theta}}{\cos(\theta)}$

④ $\dfrac{\dot{\theta}}{\theta}$

⑤ $\dot{\theta}\cos(\theta)\cos(\theta) +$

$+ \sin(\theta)(-\dot{\theta}\sin(\theta))$

$= \dot{\theta}(\cos^2(\theta) - \sin^2(\theta))$

(6) $\alpha \theta^{\alpha - 1} (\dot{\theta})$

(7) $\dfrac{d(\theta \cos(\theta))}{dt} \sin\theta + \theta\cos(\theta)(\dot{\theta}\cos(\theta))$

$$= \left(\dot{\theta}\cos(\theta) + \theta(-\dot{\theta}\sin\theta)\right)\sin\theta + \ \ldots$$

$$= \dot{\theta}\sin\theta\left(\cos\theta - \theta\sin\theta\right) + \theta\dot{\theta}\cos^2(\theta)$$

$$= \left(\dot{\theta}\cos(\theta) - \theta\dot{\theta}\sin\theta\right)(\sin\theta)$$
$$+ \theta\cos(\theta)\dot{\theta}\cos(\theta)$$

$$= \dot{\theta}\left(\cos(\theta)\sin\theta - \theta\sin^2\theta\right)$$
$$+ \theta\dot{\theta}(\cos^2(\theta))$$

$$= \dot{\theta}\left[(\cos(\theta)\sin\theta - \theta\sin^2\theta) + \theta(\cos^2(\theta))\right]$$

Unités et ana. dim

① $$F_G = [G]\frac{[kg]^2}{[m]^2} = [kg \cdot m \cdot s^{-2}]$$

$$= [G]\,[kg^2 \cdot m^{-2}]$$

$$[G] = \left[\frac{m^3}{kg \cdot s^2}\right]$$

② • ref inertiel

$$\sum \vec{F} = m\vec{a}$$

$$\vec{a} \begin{cases} a_x = 0 \\ a_y = -g \end{cases}$$

$$\vec{a} = \frac{d\vec{v}}{dt}$$

$$\vec{v} \begin{cases} v_x = v_0 \times \cos\alpha \\ v_y = -gt + V_0 \times \sin\alpha \end{cases}$$

$$\vec{v} = \frac{d\vec{OM}}{dt}$$

$$\vec{OM} \begin{cases} x = V_0 \times \cos\alpha \times t \\ y = -\frac{1}{2}gt^2 + V_0 \times \sin\alpha\, t \end{cases}$$

$$y = 0 \iff t\left(-\frac{1}{2}gt + V_0 \sin\alpha\right) = 0$$

$$\iff \frac{1}{2}gt = V_0 \sin\alpha$$

$$\iff t = \frac{2V_0 \sin\alpha}{g}$$

g

$$x = \frac{V_0 \times \cos\alpha \times 2V_0 \sin\alpha}{g}$$

$$= \frac{V_0^2}{g} \times \underbrace{2\cos\alpha\sin\alpha}_{\sin(2\alpha)}$$