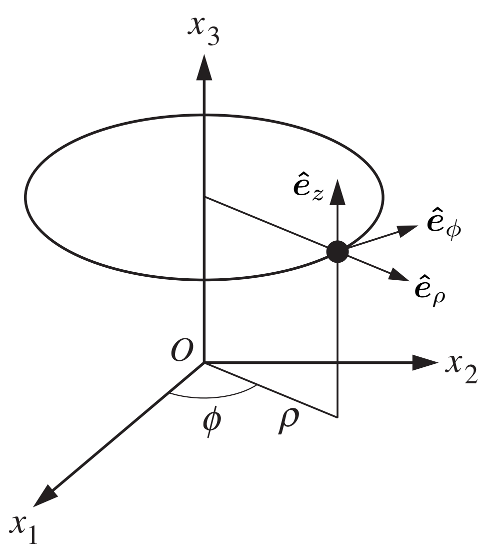
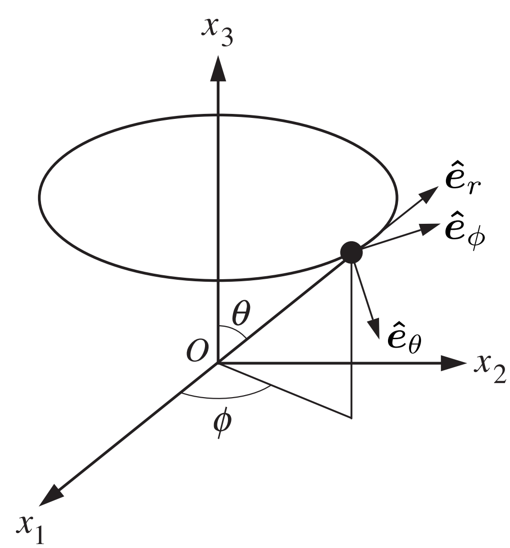
Formulaire

Coordonnées cylindriques



$$\boldsymbol{r} = \rho\,\hat{\boldsymbol{e}}_\rho + z\,\hat{\boldsymbol{e}}_z$$
$$\boldsymbol{v} = \dot\rho\,\hat{\boldsymbol{e}}_\rho + \rho\dot\phi\,\hat{\boldsymbol{e}}_\phi + \dot z\,\hat{\boldsymbol{e}}_z$$
$$\boldsymbol{a} = \left(\ddot\rho - \rho\dot\phi^2\right)\hat{\boldsymbol{e}}_\rho + \left(\rho\ddot\phi + 2\dot\rho\dot\phi\right)\hat{\boldsymbol{e}}_\phi + \ddot z\,\hat{\boldsymbol{e}}_z$$

Coordonnées sphériques



$$\boldsymbol{r} = r\,\hat{\boldsymbol{e}}_r$$
$$\boldsymbol{v} = \dot r\,\hat{\boldsymbol{e}}_r + r\dot\theta\,\hat{\boldsymbol{e}}_\theta + r\dot\phi\sin\theta\,\hat{\boldsymbol{e}}_\phi$$
$$\begin{aligned}\boldsymbol{a} = &\left(\ddot r - r\dot\theta^2 - r\dot\phi^2\sin^2\theta\right)\hat{\boldsymbol{e}}_r \\ &+ \left(r\ddot\theta + 2\dot r\dot\theta - r\dot\phi^2\sin\theta\cos\theta\right)\hat{\boldsymbol{e}}_\theta \\ &+ \left(r\ddot\phi\sin\theta + 2\dot r\dot\phi\sin\theta + 2r\dot\theta\dot\phi\cos\theta\right)\,\hat{\boldsymbol{e}}_\phi\end{aligned}$$

Coordonnées polaires

$$\boldsymbol{r} = r\,\hat{\boldsymbol{e}}_r$$
$$\boldsymbol{v} = \dot r\,\hat{\boldsymbol{e}}_r + r\dot\theta\,\hat{\boldsymbol{e}}_\theta$$
$$\boldsymbol{a} = \left(\ddot r - r\dot\theta^2\right)\hat{\boldsymbol{e}}_r + \left(r\ddot\theta + 2\dot r\dot\theta\right)\hat{\boldsymbol{e}}_\theta$$

Formule de Poisson

Soit un repère $\{A, \hat{\boldsymbol{e}}_1, \hat{\boldsymbol{e}}_2, \hat{\boldsymbol{e}}_3\}$, lié à un point A, en rotation de vitesse angulaire instantanée $\boldsymbol{\omega}$ par rapport à un référentiel d'inertie,

$$\dot{\hat{\boldsymbol{e}}}_i = \boldsymbol{\omega} \times \hat{\boldsymbol{e}}_i\ , \quad \text{où} \quad i = 1, 2, 3$$