

Correction du variateur cinétique (du printemps 2015)

$$1. \left\{ \mathcal{V}_{S_1/S_0} \right\}_O = \left\{ \begin{array}{l} \vec{\Omega}_{S_1/S_0} \\ \vec{V}_{O \in S_1/S_0} \end{array} \right\}_O = \left\{ \begin{array}{l} \omega_1 \vec{x}_1 \\ \vec{0} \end{array} \right\}_O$$

$$\left\{ \mathcal{V}_{S_1/S_0} \right\}_I = \left\{ \begin{array}{l} \vec{\Omega}_{S_1/S_0} \\ \vec{V}_{I \in S_1/S_0} \end{array} \right\}_I \quad \text{or} \quad \vec{V}_{I \in S_1/S_0} = \vec{V}_{O \in S_1/S_0} + \vec{IO} \wedge \vec{\Omega}_{S_1/S_0}$$

$$\vec{V}_{I \in S_1/S_0} = (d\vec{y}_1 + L_3 \vec{x}_1) \wedge \omega_1 \vec{x}_1 = \underline{d\omega_1 \vec{z}_1}$$

$$\left\{ \mathcal{V}_{S_1/S_0} \right\}_I = \left\{ \begin{array}{l} \omega_1 \vec{x}_1 \\ d\omega_1 \vec{z}_1 \end{array} \right\}_I$$

$$2. \left\{ \mathcal{V}_{S_2/S_1} \right\}_B = \left\{ \begin{array}{l} \omega_2 \vec{x}_2 \\ \vec{0} \end{array} \right\}_B \quad \left\{ \mathcal{V}_{S_2/S_1} \right\}_I = \left\{ \begin{array}{l} \omega_2 \vec{x}_2 \\ \vec{V}_{I \in S_2/S_1} \end{array} \right\}_I$$

$$\vec{V}_{I \in S_2/S_1} = \vec{V}_{B \in S_2/S_1} + \vec{IB} \wedge \omega_2 \vec{x}_2 = \vec{0} + \vec{IB} \wedge \omega_2 \vec{x}_2 = -d\vec{y}_2 \wedge \omega_2 \vec{x}_2 = \underline{d\omega_2 \vec{z}_2}$$

$$\left\{ \mathcal{V}_{S_2/S_1} \right\}_I = \left\{ \begin{array}{l} \omega_2 \vec{x}_2 \\ d\omega_2 \vec{z}_2 \end{array} \right\}_I$$

$$3. \vec{V}_{I \in S_1/S_0} = \vec{V}_{I \in S_1/S} + \vec{V}_{I \in S/S_0} \Rightarrow \vec{V}_{I \in S_1/S_0} = \vec{V}_{I \in S_1/S}$$

$\vec{0} \text{ (RSG)}$ $d\omega_1 \vec{z}_1 = -d\omega_2 \vec{z}_2$

comme $\vec{z}_1 = \vec{z}_2$

$d\omega_1 = -d\omega_2$

$$4. \vec{V}_{JES/S_1} = \vec{V}_{BES/S_1} + \vec{J}B \wedge \vec{\Omega}_{S/S_1} = (-R\vec{y}_2 + L\vec{x}_2) \wedge \omega \vec{x}_2$$

$$\vec{V}_{JES/S_1} = R\omega \vec{z}_2$$

$$5. \vec{V}_{JES_1/S_0} = \vec{V}_{OES_1/S_0} + \vec{J}O \wedge \vec{\Omega}_{S_1/S_0} = (-R_2\vec{y}_1 + L_2\vec{x}_1) \wedge \omega_1 \vec{x}_1$$

$$\vec{V}_{JES_1/S_0} = R_2\omega_1 \vec{z}_1$$

$$6. \left\{ \mathcal{N}_{S_2/S_0} \right\}_0 = \left\{ \begin{array}{l} \Omega_{S_2/S_0} \\ \vec{V}_{OES_2/S_0} \end{array} \right\}_0 = \left\{ \begin{array}{l} \omega_2 \vec{x} \\ \vec{0} \end{array} \right\}_0$$

$$\left\{ \mathcal{N}_{S_2/S_0} \right\}_J = \left\{ \begin{array}{l} \omega_2 \vec{x} \\ \vec{V}_{JES_2/S_0} \end{array} \right\}_0$$

$$\vec{V}_{JES_2/S_0} = \vec{V}_{OES_2/S_0} + \vec{J}O \wedge \omega_2 \vec{x} = (-R_2\vec{y}_1 + L_2\vec{x}_1) \wedge \omega_2 \vec{x}$$

$$\vec{V}_{JES_2/S_0} = R_2\omega_2 \vec{z}_1$$

$$\left\{ \mathcal{N}_{S_2/S_0} \right\}_J = \left\{ \begin{array}{l} \omega_2 \vec{x} \\ R_2\omega_2 \vec{z}_1 \end{array} \right\}_J$$

$$7. \vec{V}_{JES_2/S_0} = \vec{V}_{JES_2/S} + \vec{V}_{JES/S_1} + \vec{V}_{JES_1/S_0} = R\omega \vec{z}_2 + R_2\omega_1 \vec{z}_1$$

$\vec{0} \text{ (NSG)}$

$$\vec{V}_{JES_2/S_0} = R_2\omega_2 \vec{z}_1 = R\omega \vec{z}_2 + R_2\omega_1 \vec{z}_1$$

Comme $\vec{z}_1 = \vec{z}_2$ alors

$$R_2\omega_2 = R\omega + R_2\omega_1$$

$$8. \quad d\omega_1 = -d\omega \quad \omega = -\frac{d\omega_1}{\lambda}$$

ce qui donne $R_2\omega_2 = -\frac{Rd\omega_1}{\lambda} + R_2\omega_1 = \omega_1\left(R_2 - \frac{Rd}{\lambda}\right)$

d'où $\frac{\omega_2}{\omega_1} = \left(1 - \frac{Rd}{R_2\lambda}\right)$

Fiw