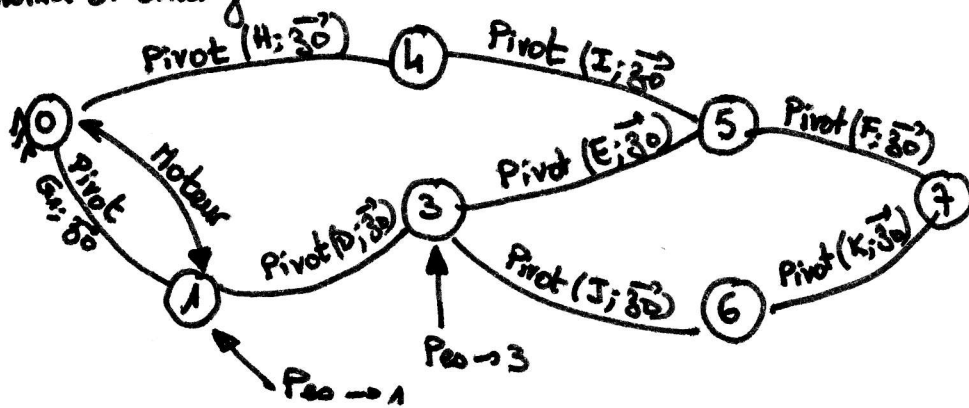


Q1 Schema d'analyse



$$Q2. {}^2T_{1/0} = \left\{ C_{1,0} \right\}_{G_1} \otimes \left\{ V_{1/0} \right\}_{G_1}$$

$${}^2T_{1/0} = M_1 \vec{V}_{G_1/R_0} \cdot \vec{V}_{G_1/R_0} + \vec{\sigma}_{G_1,1/0} \cdot \vec{\Omega}_{1/0}$$

\*  $\vec{V}_{G_1/R_0} = \vec{0}$   $G_1$  sur l'axe de rotation de 1/0.

$$* \vec{\sigma}_{G_1,1/0} = [I_{G_1,1}] \cdot \vec{\Omega}_{1/0} = \begin{pmatrix} A_1 & 0 & -E_1 \\ 0 & B_1 & 0 \\ -E_1 & 0 & C_1 \end{pmatrix} \begin{pmatrix} 0 \\ 0 \\ \dot{\theta}_1 \end{pmatrix}_{B_1}$$

$$= -E_1 \dot{\theta}_1 \vec{x}_1 + C_1 \dot{\theta}_1 \vec{y}_1$$

$${}^2T_{1/0} = C_1 \dot{\theta}_1^2 \quad \underline{T_{1/0} = \frac{1}{2} C_1 \dot{\theta}_1^2}$$

$${}^2T_{3/0} = \left\{ C_{3/0} \right\}_{G_3} \otimes \left\{ V_{3/0} \right\}_{G_3} = M_3 \vec{V}_{G_3/R_0} \cdot \vec{V}_{G_3/R_0} + \vec{\sigma}_{G_3,3/0} \cdot \vec{\Omega}_{3/0}$$

$$* \vec{V}_{G_3/R_0} = \left[ \frac{dD_{G_3}}{dt} \right]_{R_0} = \left[ \frac{da_3 \vec{x}_3}{dt} \right]_{R_0} + \left[ \frac{db_3 \vec{y}_3}{dt} \right]_{R_0} + \left[ \frac{dC_3 \vec{z}_3}{dt} \right]_{R_0}$$

$$= a_3 \dot{\theta}_3 \vec{y}_3 - b_3 \dot{\theta}_3 \vec{x}_3$$

$$* \vec{\sigma}_{G_3,3/0} = [I_{G_3,3}] \vec{\Omega}_{3/0} = C_3 \cdot \dot{\theta}_3 \vec{z}_{0,3}$$

$${}^2T_{3/0} = M_3 (a_3^2 + b_3^2) \dot{\theta}_3^2 + C_3 \dot{\theta}_3^2 \quad \underline{T_{3/0} = \frac{1}{2} ((M_3 (a_3^2 + b_3^2) + C_3) \dot{\theta}_3^2)}$$

Q3 Puissances extérieures s'appliquant à S

PM 2/2

$$P_{p00 \rightarrow 1/0} = \left\{ T_{p00 \rightarrow 1} \right\}_{G_1} \otimes \left\{ V_{1/0} \right\}_{G_1} = 0$$

$$P_{p00 \rightarrow 3/0} = \left\{ T_{p00 \rightarrow 3} \right\}_{G_3} \otimes \left\{ V_{3/0} \right\}_{G_3} = -M_3 g \vec{z}_0 \cdot (a_3 \dot{\theta}_3 \vec{y}_3 - b_3 \dot{\theta}_3 \vec{x}_3) = 0.$$

$$\left. \begin{array}{l} P_0 \rightarrow 1/0 = 0 \\ P_0 \rightarrow 4/0 = 0 \\ P_0 \rightarrow 3/0 = 0 \end{array} \right\} \text{liaisons parfaites}$$

$$P_0 \xrightarrow{\text{mot}} 1/0 = \left\{ T_{\text{mot} \rightarrow 1} \right\}_{G_1} \otimes \left\{ V_{1/0} \right\}_{G_1}$$
$$= C_{\text{mot}} \cdot \vec{z}_1 \cdot \dot{\theta}_1 \vec{z}_1'$$

$$\underline{P_0 \xrightarrow{\text{mot}} 1/0 = C_{\text{mot}} \cdot \dot{\theta}_1}$$

Puissances intérieures à S

$P_{\text{int}} = 0$  toutes les liaisons sont parfaites

Q4 TEC appliqué à S.

$$\frac{d}{dt} \left( \frac{1}{2} C_1 \dot{\theta}_1^2 \right) + \frac{d}{dt} \left( \frac{1}{2} \left( (M_3 (a_3^2 + b_3^2) + C_3) \dot{\theta}_3^2 \right) \right) = C_{\text{mot}} \cdot \dot{\theta}_1$$

$$\underline{C_1 \dot{\theta}_1 \ddot{\theta}_1 + (M_3 (a_3^2 + b_3^2) + C_3) \dot{\theta}_3 \ddot{\theta}_3 = C_{\text{mot}} \cdot \dot{\theta}_1}$$