

Tableau des liaisons parfaites

Niveau intermédiaire

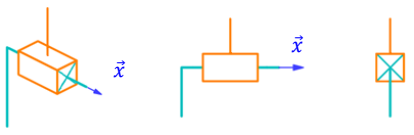

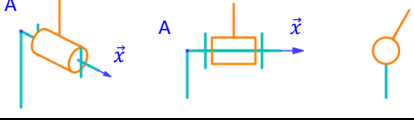
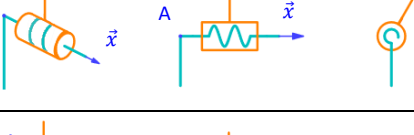
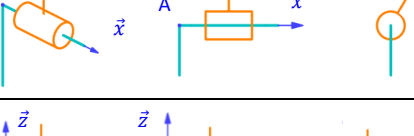
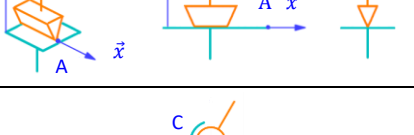
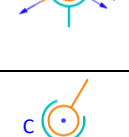
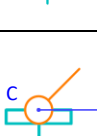
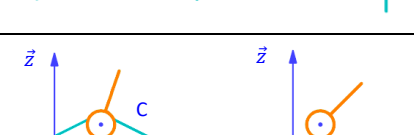
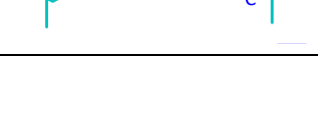
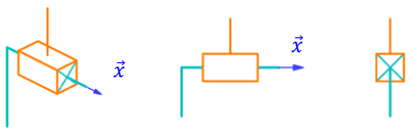
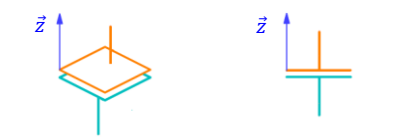
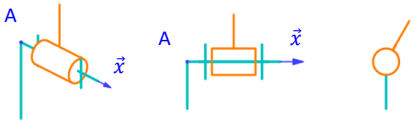
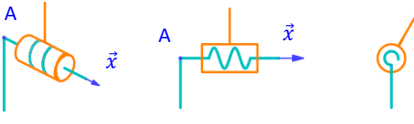
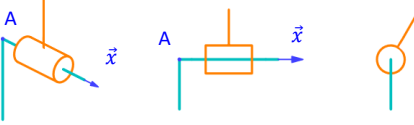
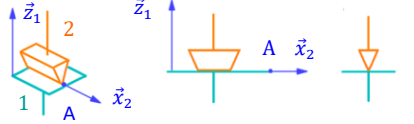
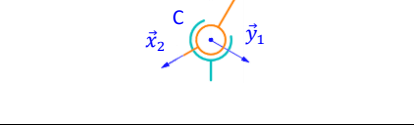
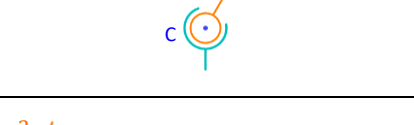
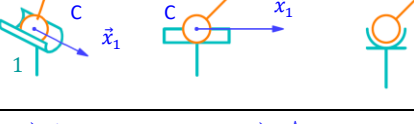

	Nom de la liaison	Schématisation spatiale et plane	Torseur cinématique	Torseur des actions mécaniques	DDL
Liaison à direction	Glissière de direction \vec{x}		$\mathcal{V}(2/1) = {}_P \begin{Bmatrix} \vec{0} \\ v_{xP21}\vec{x} \end{Bmatrix}$	$\mathcal{F}(1 \rightarrow 2) = {}_P \begin{Bmatrix} Y_{12}\vec{y} + Z_{12}\vec{z} \\ L_{12}\vec{x} + M_{12}\vec{y} + N_{12}\vec{z} \end{Bmatrix}$	1
	Plane de normale \vec{z}		$\mathcal{V}(2/1) = {}_P \begin{Bmatrix} \omega_{z21}\vec{z} \\ v_{xP21}\vec{x} + v_{yP21}\vec{y} \end{Bmatrix}$	$\mathcal{F}(1 \rightarrow 2) = {}_P \begin{Bmatrix} Z_{12}\vec{z} \\ L_{12}\vec{x} + M_{12}\vec{y} \end{Bmatrix}$	3
Liaison à axe	Pivot d'axe (A, \vec{x})		$\mathcal{V}(2/1) = {}_A \begin{Bmatrix} \omega_{x21}\vec{x} \\ \vec{0} \end{Bmatrix}$	$\mathcal{F}(1 \rightarrow 2) = {}_A \begin{Bmatrix} X_{12}\vec{x} + Y_{12}\vec{y} + Z_{12}\vec{z} \\ M_{12}\vec{y} + N_{12}\vec{z} \end{Bmatrix}$	1
	Hélicoïdale d'axe (A, \vec{x}) et de pas p		$\mathcal{V}(2/1) = {}_A \begin{Bmatrix} \omega_{x21}\vec{x} \\ v_{xA21}\vec{x} \end{Bmatrix}$ avec $v_{xA21} = \pm \frac{p}{2\pi} \omega_{x21}$	$\mathcal{F}(1 \rightarrow 2) = {}_A \begin{Bmatrix} X_{12}\vec{x} + Y_{12}\vec{y} + Z_{12}\vec{z} \\ L_{12}\vec{x} + M_{12}\vec{y} + N_{12}\vec{z} \end{Bmatrix}$ avec $L_{12} = \mp \frac{p}{2\pi} X_{12}$	1
	Pivot glissant d'axe (A, \vec{x})		$\mathcal{V}(2/1) = {}_A \begin{Bmatrix} \omega_{x21}\vec{x} \\ v_{xA21}\vec{x} \end{Bmatrix}$	$\mathcal{F}(1 \rightarrow 2) = {}_A \begin{Bmatrix} Y_{12}\vec{y} + Z_{12}\vec{z} \\ M_{12}\vec{y} + N_{12}\vec{z} \end{Bmatrix}$	2
	Cylindre-plan d'axe (A, \vec{x}) et de normale \vec{z}		$\mathcal{V}(2/1) = {}_A \begin{Bmatrix} \omega_{x21}\vec{x} + \omega_{z21}\vec{z} \\ v_{xA21}\vec{x} + v_{yA21}\vec{y} \end{Bmatrix}$	$\mathcal{F}(1 \rightarrow 2) = {}_A \begin{Bmatrix} Z_{12}\vec{z} \\ M_{12}\vec{y} \end{Bmatrix}$	4
Liaison à centre	Sphérique à doigt de centre C , d'axe (C, \vec{x}) et de normale \vec{y}		$\mathcal{V}(2/1) = {}_C \begin{Bmatrix} \omega_{x21}\vec{x} + \omega_{y21}\vec{y} \\ \vec{0} \end{Bmatrix}$	$\mathcal{F}(1 \rightarrow 2) = {}_C \begin{Bmatrix} X_{12}\vec{x} + Y_{12}\vec{y} + Z_{12}\vec{z} \\ N_{12}\vec{z} \end{Bmatrix}$	2
	Sphérique de centre C		$\mathcal{V}(2/1) = {}_C \begin{Bmatrix} \omega_{x21}\vec{x} + \omega_{y21}\vec{y} + \omega_{z21}\vec{z} \\ \vec{0} \end{Bmatrix}$	$\mathcal{F}(1 \rightarrow 2) = {}_C \begin{Bmatrix} X_{12}\vec{x} + Y_{12}\vec{y} + Z_{12}\vec{z} \\ \vec{0} \end{Bmatrix}$	3
	Sphère-cylindre de centre C et de direction \vec{x}		$\mathcal{V}(2/1) = {}_C \begin{Bmatrix} \omega_{x21}\vec{x} + \omega_{y21}\vec{y} + \omega_{z21}\vec{z} \\ v_{xC21}\vec{x} \end{Bmatrix}$	$\mathcal{F}(1 \rightarrow 2) = {}_C \begin{Bmatrix} Y_{12}\vec{y} + Z_{12}\vec{z} \\ \vec{0} \end{Bmatrix}$	4
	Sphère-plan de centre C et de normale \vec{z}		$\mathcal{V}(2/1) = {}_C \begin{Bmatrix} \omega_{x21}\vec{x} + \omega_{y21}\vec{y} + \omega_{z21}\vec{z} \\ v_{xC21}\vec{x} + v_{yC21}\vec{y} \end{Bmatrix}$	$\mathcal{F}(1 \rightarrow 2) = {}_C \begin{Bmatrix} Z_{12}\vec{z} \\ \vec{0} \end{Bmatrix}$	5

Tableau des liaisons parfaites

Niveau avancé

	Nom de la liaison	Schématisation spatiale et plane	Torseur cinématique	Torseur des actions mécaniques	DDL
Liaison à direction	Glissière de direction \vec{x}		$\vec{V}_{2/1} = {}_P \begin{Bmatrix} \vec{0} \\ v_{x,P,2/1} \vec{x} \end{Bmatrix}$	$\vec{M}_{1 \rightarrow 2} = {}_P \begin{Bmatrix} Y_{1 \rightarrow 2} \vec{y} + Z_{1 \rightarrow 2} \vec{z} \\ L_{1 \rightarrow 2} \vec{x} + M_{1 \rightarrow 2} \vec{y} + N_{1 \rightarrow 2} \vec{z} \end{Bmatrix}$	1
	Plane de normale \vec{z}		$\vec{V}_{2/1} = {}_P \begin{Bmatrix} \omega_{z,2/1} \vec{z} \\ v_{x,P,2/1} \vec{x} + v_{y,P,2/1} \vec{y} \end{Bmatrix}$	$\vec{M}_{1 \rightarrow 2} = {}_P \begin{Bmatrix} Z_{1 \rightarrow 2} \vec{z} \\ L_{1 \rightarrow 2} \vec{x} + M_{1 \rightarrow 2} \vec{y} \end{Bmatrix}$	3
Liaison à axe	Pivot d'axe (A, \vec{x})		$\vec{V}_{2/1} = {}_A \begin{Bmatrix} \omega_{x,2/1} \vec{x} \\ \vec{0} \end{Bmatrix}$	$\vec{M}_{1 \rightarrow 2} = {}_A \begin{Bmatrix} X_{1 \rightarrow 2} \vec{x} + Y_{1 \rightarrow 2} \vec{y} + Z_{1 \rightarrow 2} \vec{z} \\ M_{1 \rightarrow 2} \vec{y} + N_{1 \rightarrow 2} \vec{z} \end{Bmatrix}$	1
	Hélicoïdale d'axe (A, \vec{x}) et de pas p		$\vec{V}_{2/1} = {}_A \begin{Bmatrix} \omega_{x,2/1} \vec{x} \\ v_{x,A,2/1} \vec{x} \end{Bmatrix}$ avec $v_{x,A,2/1} = p \omega_{x,2/1}$ avec p positif pour un pas à droite	$\vec{M}_{1 \rightarrow 2} = {}_A \begin{Bmatrix} X_{1 \rightarrow 2} \vec{x} + Y_{1 \rightarrow 2} \vec{y} + Z_{1 \rightarrow 2} \vec{z} \\ L_{1 \rightarrow 2} \vec{x} + M_{1 \rightarrow 2} \vec{y} + N_{1 \rightarrow 2} \vec{z} \end{Bmatrix}$ avec $L_{1 \rightarrow 2} = -p X_{1 \rightarrow 2}$ avec p positif pour un pas à droite	1
	Pivot glissant d'axe (A, \vec{x})		$\vec{V}_{2/1} = {}_A \begin{Bmatrix} \omega_{x,2/1} \vec{x} \\ v_{x,A,2/1} \vec{x} \end{Bmatrix}$	$\vec{M}_{1 \rightarrow 2} = {}_A \begin{Bmatrix} Y_{1 \rightarrow 2} \vec{y} + Z_{1 \rightarrow 2} \vec{z} \\ M_{1 \rightarrow 2} \vec{y} + N_{1 \rightarrow 2} \vec{z} \end{Bmatrix}$	2
	Cylindre-plan d'axe (A_2, \vec{x}_2) et de normale \vec{z}_1		$\vec{V}_{2/1} = {}_A \begin{Bmatrix} \omega_{x,2/1} \vec{x}_2 + \omega_{z,2/1} \vec{z}_1 \\ v_{x,A,2/1} \vec{x}_1 + v_{y,A,2/1} \vec{y}_1 \end{Bmatrix}$	$\vec{M}_{1 \rightarrow 2} = {}_A \begin{Bmatrix} Z_{1 \rightarrow 2} \vec{z}_1 \\ M_{1 \rightarrow 2} \vec{z}_1 \wedge \vec{x}_2 \end{Bmatrix}$	4
Liaison à centre	Sphérique à doigt de centre C , d'axe (C, \vec{x}_2) et de normale \vec{y}_1		$\vec{V}_{2/1} = {}_C \begin{Bmatrix} \omega_{x,2/1} \vec{x}_2 + \omega_{y,2/1} \vec{y}_1 \\ \vec{0} \end{Bmatrix}$	$\vec{M}_{1 \rightarrow 2} = {}_C \begin{Bmatrix} X_{1 \rightarrow 2} \vec{x} + Y_{1 \rightarrow 2} \vec{y} + Z_{1 \rightarrow 2} \vec{z} \\ N_{1 \rightarrow 2} \vec{x}_2 \wedge \vec{y}_1 \end{Bmatrix}$	2
	Sphérique de centre C		$\vec{V}_{2/1} = {}_C \begin{Bmatrix} \omega_{x,2/1} \vec{x} + \omega_{y,2/1} \vec{y} + \omega_{z,2/1} \vec{z} \\ \vec{0} \end{Bmatrix}$	$\vec{M}_{1 \rightarrow 2} = {}_C \begin{Bmatrix} X_{1 \rightarrow 2} \vec{x} + Y_{1 \rightarrow 2} \vec{y} + Z_{1 \rightarrow 2} \vec{z} \\ \vec{0} \end{Bmatrix}$	3
	Sphère-cylindre de centre C_2 et de direction \vec{x}_1		$\vec{V}_{2/1} = {}_C \begin{Bmatrix} \omega_{x,2/1} \vec{x} + \omega_{y,2/1} \vec{y} + \omega_{z,2/1} \vec{z} \\ v_{x,C,2/1} \vec{x}_1 \end{Bmatrix}$	$\vec{M}_{1 \rightarrow 2} = {}_C \begin{Bmatrix} Y_{1 \rightarrow 2} \vec{y}_1 + Z_{1 \rightarrow 2} \vec{z}_1 \\ \vec{0} \end{Bmatrix}$	4
	Sphère-plan de centre C_2 et de normale \vec{z}_1		$\vec{V}_{2/1} = {}_C \begin{Bmatrix} \omega_{x,2/1} \vec{x} + \omega_{y,2/1} \vec{y} + \omega_{z,2/1} \vec{z} \\ v_{x,C,2/1} \vec{x}_1 + v_{y,C,2/1} \vec{y}_1 \end{Bmatrix}$	$\vec{M}_{1 \rightarrow 2} = {}_C \begin{Bmatrix} Z_{1 \rightarrow 2} \vec{z}_1 \\ \vec{0} \end{Bmatrix}$	5