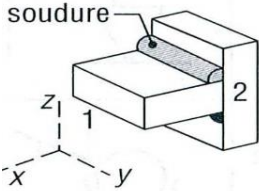
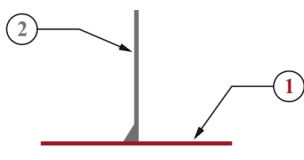
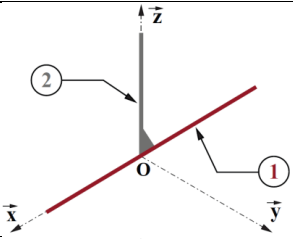
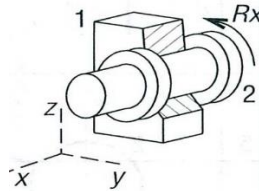
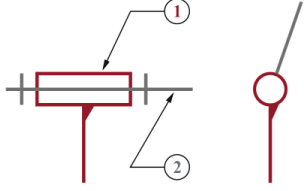
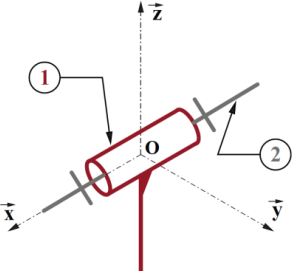
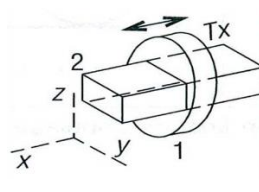
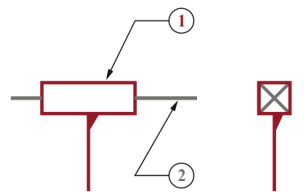
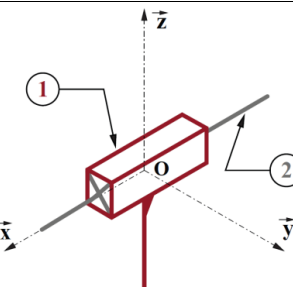
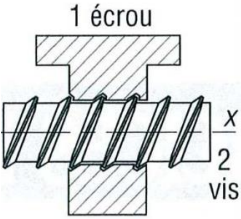
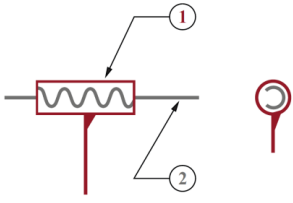
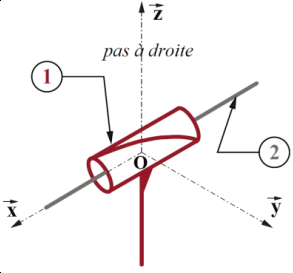
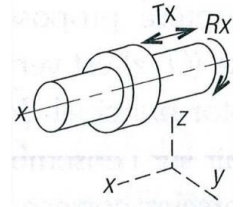
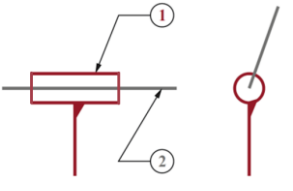
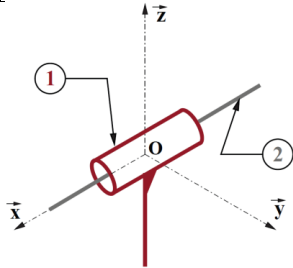
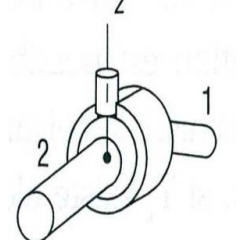
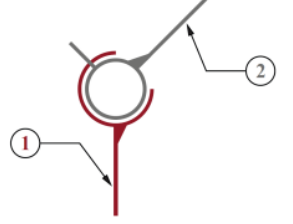
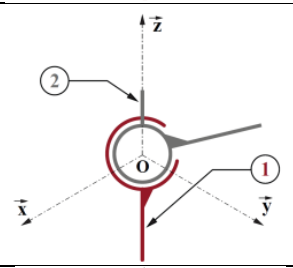
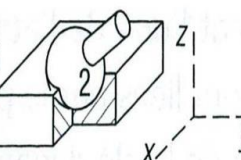
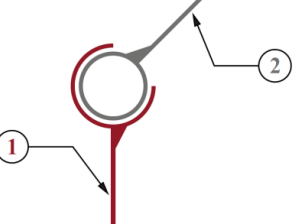
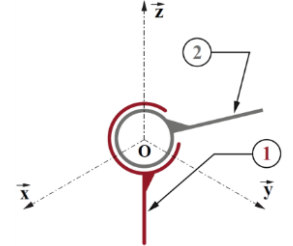


Torseurs cinématiques et statiques des liaisons usuelles parfaites

Schéma	Liaison	Éléments Géom	2D	3D	$\{V_{2/1}\}$	$\{T_{2/1}\}$	Validité P	\mathfrak{B}	I_c	I_s
	Encastrement E	RAS			$\begin{Bmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{Bmatrix}_P^{\mathfrak{B}}$	$\begin{Bmatrix} X_{2/1} & L_{2/1} \\ Y_{2/1} & M_{2/1} \\ Z_{2/1} & N_{2/1} \end{Bmatrix}_P^{\mathfrak{B}}$	$\forall P$	— — —	0	6
	Pivot P	(O, \vec{x})			$\begin{Bmatrix} P_{2/1} & 0 \\ 0 & 0 \\ 0 & 0 \end{Bmatrix}_P^{\mathfrak{B}}$	$\begin{Bmatrix} X_{2/1} & 0 \\ Y_{2/1} & M_{2/1} \\ Z_{2/1} & N_{2/1} \end{Bmatrix}_P^{\mathfrak{B}}$	(O, \vec{x})	\vec{x} — —	1	5
	Glissière Gl	\vec{x}			$\begin{Bmatrix} 0 & U_{2/1} \\ 0 & 0 \\ 0 & 0 \end{Bmatrix}_P^{\mathfrak{B}}$	$\begin{Bmatrix} 0 & L_{2/1} \\ Y_{2/1} & M_{2/1} \\ Z_{2/1} & N_{2/1} \end{Bmatrix}_P^{\mathfrak{B}}$	$\forall P$	\vec{x} — —	1	5

	<p>Hélicoïdale <i>He</i></p>	<p>(O, \vec{x})</p>			$\begin{Bmatrix} P_{2/1} & U_{2/1} \\ 0 & 0 \\ 0 & 0 \end{Bmatrix}_{\mathcal{B}_P}^{\mathcal{B}}$ $U_{2/1} = \frac{\text{pas}}{2\pi} P_{2/1}$	$\begin{Bmatrix} X_{2/1} & L_{2/1} \\ Y_{2/1} & M_{2/1} \\ Z_{2/1} & N_{2/1} \end{Bmatrix}_P^{\mathcal{B}}$ $L_{2/1} = -\frac{\text{pas}}{2\pi} X_{2/1}$	<p>(O, \vec{x})</p>	<p>\vec{x} — —</p>	<p>1</p>	<p>5</p>
	<p>Pivot Glissant <i>PG</i></p>	<p>(O, \vec{x})</p>			$\begin{Bmatrix} P_{2/1} & U_{2/1} \\ 0 & 0 \\ 0 & 0 \end{Bmatrix}_P^{\mathcal{B}}$	$\begin{Bmatrix} 0 & 0 \\ Y_{2/1} & M_{2/1} \\ Z_{2/1} & N_{2/1} \end{Bmatrix}_P^{\mathcal{B}}$	<p>(O, \vec{x})</p>	<p>\vec{x} — —</p>	<p>2</p>	<p>4</p>
	<p>Rotule à doigt Sphérique à doigt</p>	<p>O Rainure (O, \vec{x}, \vec{z}) Doigt \vec{z}</p>			$\begin{Bmatrix} 0 & 0 \\ Q_{2/1} & 0 \\ R_{2/1} & 0 \end{Bmatrix}_P^{\mathcal{B}}$	$\begin{Bmatrix} X_{2/1} & L_{2/1} \\ Y_{2/1} & 0 \\ Z_{2/1} & 0 \end{Bmatrix}_P^{\mathcal{B}}$ <p>Ref \mathcal{B}_1 & \mathcal{B}_2</p>	<p>O</p>	<p>\vec{x} \vec{y} \vec{z}</p>	<p>2</p>	<p>4</p>
	<p>Rotule <i>R</i> Sphérique <i>S</i></p>	<p>O</p>			$\begin{Bmatrix} P_{2/1} & 0 \\ Q_{2/1} & 0 \\ R_{2/1} & 0 \end{Bmatrix}_P^{\mathcal{B}}$	$\begin{Bmatrix} X_{2/1} & 0 \\ Y_{2/1} & 0 \\ Z_{2/1} & 0 \end{Bmatrix}_P^{\mathcal{B}}$	<p>O</p>	<p>— — —</p>	<p>3</p>	<p>3</p>

	<p>Appui plan <i>AP</i></p>	\vec{z}			$\begin{Bmatrix} 0 & U_{2/1} \\ 0 & V_{2/1} \\ R_{2/1} & 0 \end{Bmatrix}_P^{\mathcal{B}}$	$\begin{Bmatrix} 0 & L_{2/1} \\ 0 & M_{2/1} \\ Z_{2/1} & 0 \end{Bmatrix}_P^{\mathcal{B}}$	$\forall P$	\vec{z}	3	3
<p>sphère dans cylindre</p>	<p>Linéaire annulaire <i>LA</i></p> <p>Sphère cylindre <i>SC</i></p>	(O, \vec{x})			$\begin{Bmatrix} P_{2/1} & U_{2/1} \\ Q_{2/1} & 0 \\ R_{2/1} & 0 \end{Bmatrix}_P^{\mathcal{B}}$ <i>Ref</i> \mathcal{B}_1	$\begin{Bmatrix} 0 & 0 \\ Y_{2/1} & 0 \\ Z_{2/1} & 0 \end{Bmatrix}_P^{\mathcal{B}}$ <i>Ref</i> \mathcal{B}_1	O	\vec{x} — —	4	2
	<p>Linéaire rectiligne <i>LR</i></p> <p>Cylindre Plan <i>CP</i></p>	$\{(O, \vec{x}), \vec{z}\}$			$\begin{Bmatrix} P_{2/1} & U_{2/1} \\ 0 & V_{2/1} \\ R_{2/1} & 0 \end{Bmatrix}_P^{\mathcal{B}}$ <i>Ref</i> \mathcal{B}_1 & \mathcal{B}_2	$\begin{Bmatrix} 0 & 0 \\ 0 & M_{2/1} \\ Z_{2/1} & 0 \end{Bmatrix}_P^{\mathcal{B}}$ <i>Ref</i> \mathcal{B}_1 & \mathcal{B}_2	(O, \vec{x}, \vec{z})	\vec{x} \vec{y} \vec{z}	4	2
<p>sphère sur plan</p>	<p>Ponctuelle <i>Pct</i></p> <p>Sphère plan <i>SP</i></p>	(O, \vec{x})			$\begin{Bmatrix} P_{2/1} & 0 \\ Q_{2/1} & V_{2/1} \\ R_{2/1} & W_{2/1} \end{Bmatrix}_P^{\mathcal{B}}$	$\begin{Bmatrix} X_{2/1} & 0 \\ 0 & 0 \\ 0 & 0 \end{Bmatrix}_P^{\mathcal{B}}$ <i>Ref</i> \mathcal{B}_1	(O, \vec{x})	\vec{x} — —	5	1

Dernière mise à jour 28/11/2016	Fiche Torseurs Cinématique - Statique	Denis DEFAUCHY Les indispensables
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Ancienne norme

Pivot	Pivot Glissant	Hélicoïdale
		<p>pas à droite ($p > 0$)</p> <p>pas à gauche ($p < 0$)</p>
Ponctuelle		

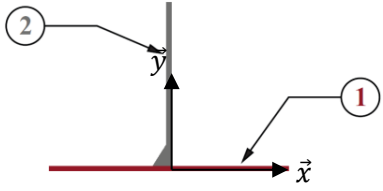
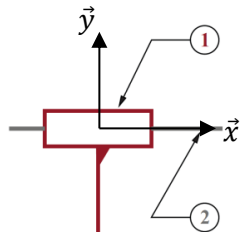
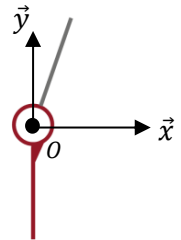
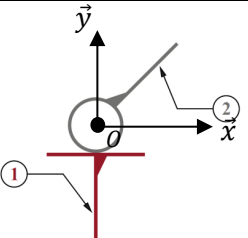
Liaison non usuelle parfois rencontrée

Ex : 2 arbres – Cannelures sur faible longueur / Disques d'embrayages ou freins

	Linéaire annulaire à doigt	(O, \vec{x}) Doigt non // à \vec{x}			$\begin{Bmatrix} 0 & U_{2/1} \\ Q_{2/1} & 0 \\ R_{2/1} & 0 \end{Bmatrix}_0^{\mathcal{B}}$	$\begin{Bmatrix} 0 & L_{2/1} \\ Y_{2/1} & 0 \\ Z_{2/1} & 0 \end{Bmatrix}_P^{\mathcal{B}}$	0	\vec{x} \vec{y} \vec{z}	3	3
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Dernière mise à jour 28/11/2016	Fiche Torseurs Cinématique - Statique	Denis DEFAUCHY Les indispensables
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Liaisons planes dans le plan (O, \vec{x}, \vec{y})

Encastrement		$\begin{Bmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{Bmatrix}_{\forall P}^{\mathfrak{B}_0}$	$\begin{Bmatrix} X_{2/1} & 0 \\ Y_{2/1} & 0 \\ 0 & N_{2/1} \end{Bmatrix}_P^{\mathfrak{B}}$	$\forall P$	$I_c^{2D} = 0$	$I_s^{2D} = 3$
Glissière \vec{x}		$\begin{Bmatrix} 0 & U_{2/1} \\ 0 & 0 \\ 0 & 0 \end{Bmatrix}_{\forall P}^{\mathfrak{B}_0}$	$\begin{Bmatrix} 0 & 0 \\ Y_{2/1} & 0 \\ 0 & N_{2/1} \end{Bmatrix}_P^{\mathfrak{B}}$	$\forall P$	$I_c^{2D} = 1$	$I_s^{2D} = 2$
Pivot (O, \vec{z})		$\begin{Bmatrix} 0 & 0 \\ 0 & 0 \\ R_{2/1} & 0 \end{Bmatrix}_O^{\mathfrak{B}_0}$	$\begin{Bmatrix} X_{2/1} & 0 \\ Y_{2/1} & 0 \\ 0 & 0 \end{Bmatrix}_P^{\mathfrak{B}}$	(O, \vec{z})	$I_c^{2D} = 1$	$I_s^{2D} = 2$
Ponctuelle (O, \vec{y})		$\begin{Bmatrix} 0 & U_{2/1} \\ 0 & 0 \\ R_{2/1} & 0 \end{Bmatrix}_O^{\mathfrak{B}_0}$ $P \in (O, \vec{y})$	$\begin{Bmatrix} 0 & 0 \\ Y_{2/1} & 0 \\ 0 & 0 \end{Bmatrix}_P^{\mathfrak{B}}$	(O, \vec{y})	$I_c^{2D} = 2$	$I_s^{2D} = 1$