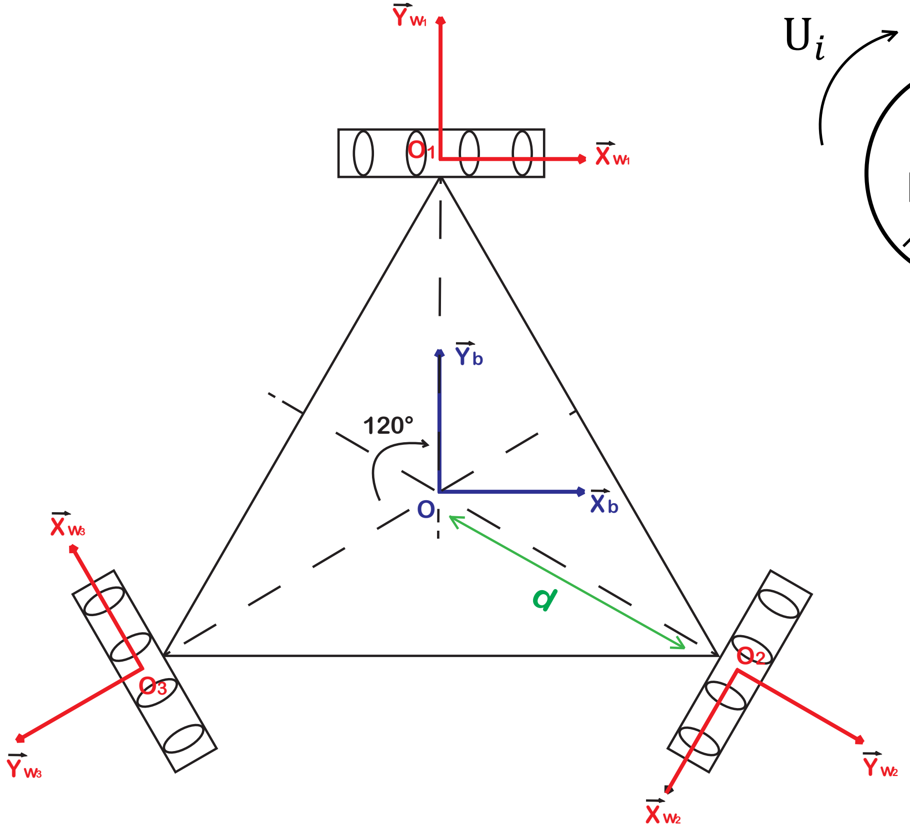
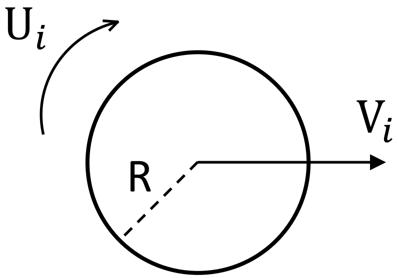




Roulement sans glissement

$$\boxed{U_i = \frac{V_i}{R}}$$

$$\vec{V}_{O_{1\in1/0}} = \vec{V}_{O\in1/0} + \vec{\Omega}_{1/0} \wedge \overrightarrow{OO_1}$$

$$V_{x_1} = \vec{V}_{O_{1\in1/0}} \cdot \overrightarrow{x_{w_1}}$$

$$\boxed{V_{x_1} = V_{x_b}\cos(\varphi) + V_{y_b}\, sin(\varphi) - d\dot{\varphi}}$$

$$\vec{V}_{O_{2\in2/0}} = \vec{V}_{O\in2/0} + \vec{\Omega}_{2/0} \wedge \overrightarrow{OO_2}$$

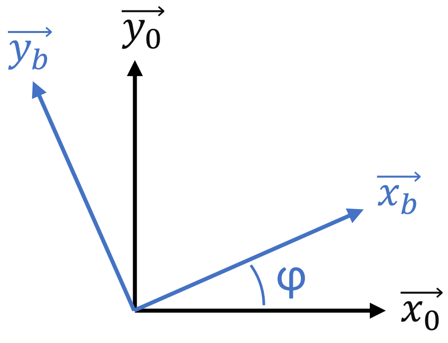
$$V_{x_2} = \vec{V}_{O_{2\in2/0}} \cdot \overrightarrow{x_{w_2}}$$

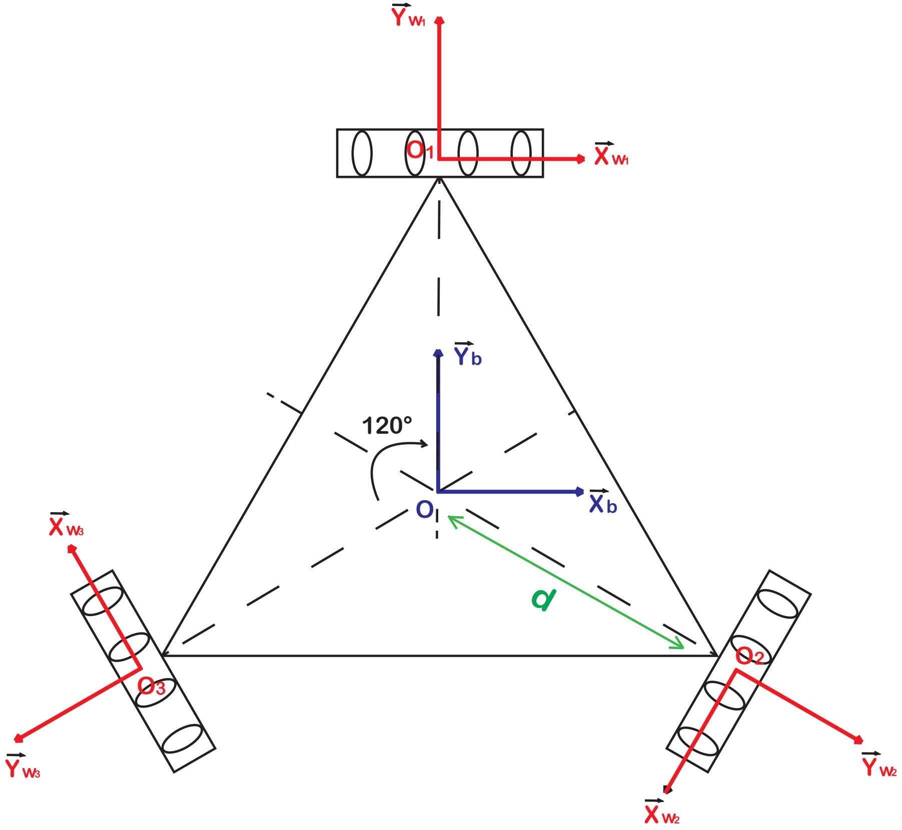
$$\boxed{V_{x_2} = - V_{x_b}\cos\left(\varphi + \frac{\pi}{3}\right) - V_{y_b}\, sin\left(\varphi + \frac{\pi}{3}\right) + d\dot{\varphi}\, sin\left(\frac{\pi}{6} - \frac{2\pi}{3}\right)}$$

$$\vec{V}_{O_{3\in3/0}} = \vec{V}_{O\in3/0} + \vec{\Omega}_{3/0} \wedge \overrightarrow{OO_3}$$

$$V_{x_3} = \vec{V}_{O_{3\in3/0}} \cdot \overrightarrow{x_{w_3}}$$

$$\boxed{V_{x_3} = - V_{x_b}\, sin\left(\varphi + \frac{\pi}{6}\right) + V_{y_b}\, cos\left(\varphi + \frac{\pi}{6}\right) + d\dot{\varphi}\, sin\left(\frac{\pi}{6} - \frac{2\pi}{3}\right)}$$

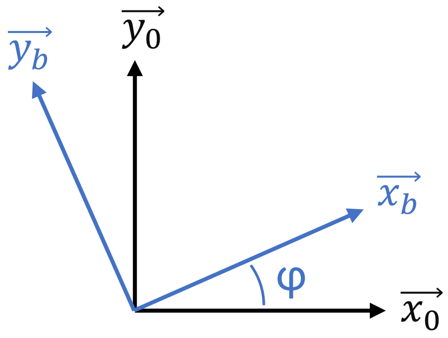




$$
\begin{cases}
U_1 = \dfrac{V_{x_1}}{R} = \dfrac{1}{R} * \left(V_{x_b}\cos(\varphi) + V_{y_b}\sin(\varphi) - d\dot{\varphi}\right) \\[2ex]
U_2 = \dfrac{V_{x_2}}{R} = \dfrac{1}{R} * \left(- V_{x_b}\cos\left(\varphi + \frac{\pi}{3}\right) - V_{y_b}\sin\left(\varphi + \frac{\pi}{3}\right) + d\dot{\varphi}\sin\left(\frac{\pi}{6} - \frac{2\pi}{3}\right)\right) \\[2ex]
U_3 = \dfrac{V_{x_3}}{R} = \dfrac{1}{R} * \left(- V_{x_b}\sin\left(\varphi + \frac{\pi}{6}\right) + V_{y_b}\cos\left(\varphi + \frac{\pi}{6}\right) + d\dot{\varphi}\sin\left(\frac{\pi}{6} - \frac{2\pi}{3}\right)\right)
\end{cases}
$$

$$
\begin{pmatrix} U_1 \\ U_2 \\ U_3 \end{pmatrix} = \frac{1}{R}
\begin{pmatrix}
\cos(\varphi) & \sin(\varphi) & -d \\
-\cos\left(\varphi + \frac{\pi}{3}\right) & -\sin\left(\varphi + \frac{\pi}{3}\right) & d\sin\left(\frac{\pi}{6} - \frac{2\pi}{3}\right) \\
-\sin\left(\varphi + \frac{\pi}{6}\right) & \cos\left(\varphi + \frac{\pi}{6}\right) & d\sin\left(\frac{\pi}{6} - \frac{2\pi}{3}\right)
\end{pmatrix}
\begin{pmatrix} V_{x_b} \\ V_{y_b} \\ \dot{\varphi} \end{pmatrix}
$$

$\boxed{\text{Loi cinematique pour } \varphi = 0}$



$$
\begin{pmatrix} U_1 \\ U_2 \\ U_3 \end{pmatrix} = \frac{1}{R}
\begin{pmatrix}
1 & 0 & -d \\
-1/2 & -\sin\left(\frac{\pi}{3}\right) & -d \\
-1/2 & \cos\left(\frac{\pi}{6}\right) & -d
\end{pmatrix}
\begin{pmatrix} V_{x_b} \\ V_{y_b} \\ \dot{\varphi} \end{pmatrix}
$$