

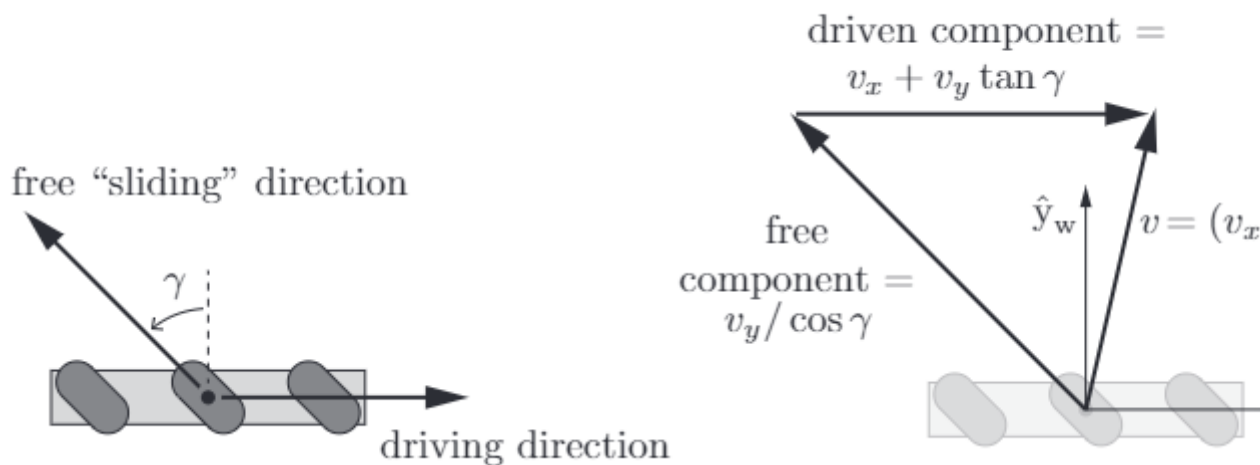
# Kinematic calculations for mobile robots using Omni/Meccanum wheels

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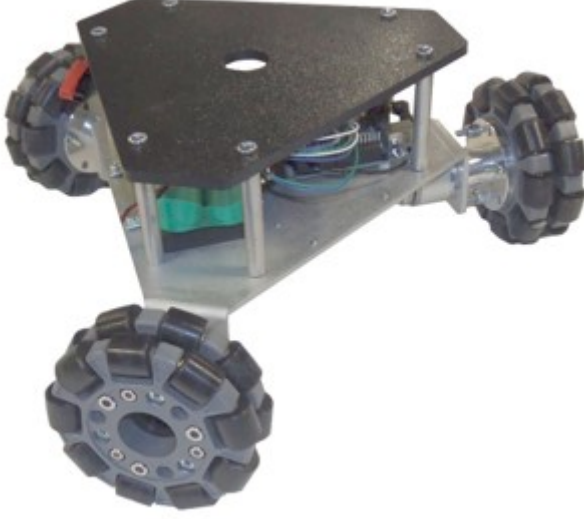
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## 1 Generalized expression

This general expression is taken from the book "Modern robotics mechanics planning and control" by Kevin M Lynch, Frank C Park, page no 512, please refer this section for more details.



## 2 Three wheel omnidirectional robot



$$h_1(0)\mathcal{V}_b = \frac{1}{r_i} \begin{bmatrix} 1 & \tan \gamma_i \end{bmatrix} \begin{bmatrix} \cos \beta_i & \sin \beta_i \\ -\sin \beta_i & \cos \beta_i \end{bmatrix} \begin{bmatrix} -y_i & 1 & 0 \\ x_i & 0 & 1 \end{bmatrix} \mathcal{V}_b \quad (1)$$

$$\gamma_1 = 0, \beta_1 = 0 \quad (2)$$

$$= \frac{1}{r_i} \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} \cos 0 & \sin 0 \\ -\sin 0 & \cos 0 \end{bmatrix} \mathcal{V}_b \quad (3)$$

$$= \frac{1}{r_i} \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \mathcal{V}_b \quad (4)$$