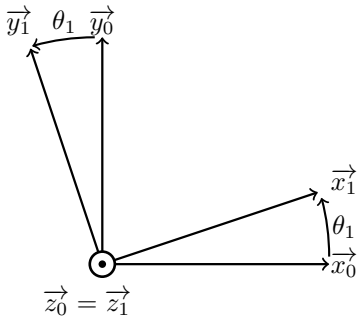

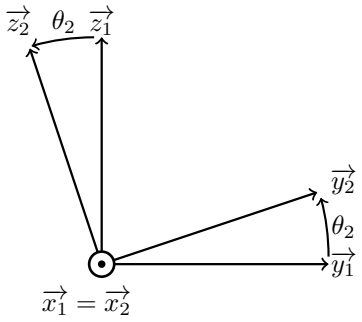

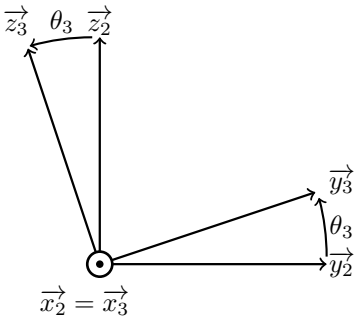

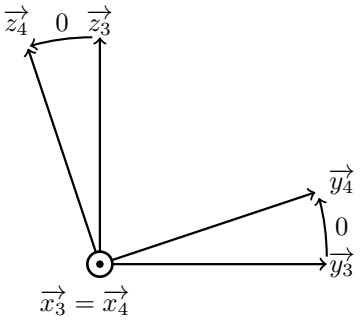

$\overrightarrow{OO_1} = L_0 \cdot \overrightarrow{z_0}$

$\overrightarrow{O_1O_2} = L_1 \cdot \overrightarrow{y_2}$

$\overrightarrow{O_2O_3} = L_2 \cdot \overrightarrow{y_3}$

$\overrightarrow{O_3O_4} = -L_3 \cdot \overrightarrow{z_3}$

$\overrightarrow{V_{O_4 \in 4/0}} = \overrightarrow{V_{O_4 \in 4/3}} + \overrightarrow{V_{O_4 \in 3/2}} + \overrightarrow{V_{O_4 \in 2/1}} + \overrightarrow{V_{O_4 \in 1/0}}$

$\overrightarrow{V_{O_4 \in 4/0}} = -\dot{L_3} \cdot \overrightarrow{z_3} + -(-L_3 \cdot \overrightarrow{z_3} + L_2 \cdot \overrightarrow{y_3}) \wedge \dot{\theta_3} \cdot \overrightarrow{x_3} + (-L_0 \cdot \dot{\theta_1} \cdot \overrightarrow{z_1} \wedge \overrightarrow{z_0} - (-L_3 \cdot \overrightarrow{z_3} + L_2 \cdot \overrightarrow{y_3} + L_1 \cdot \overrightarrow{y_2}) \wedge \dot{\theta_2} \cdot \overrightarrow{x_2}) + -(-L_3 \cdot \overrightarrow{z_3} + L_2 \cdot \overrightarrow{y_3} + L_1 \cdot \overrightarrow{y_2} + L_0 \cdot \overrightarrow{z_0}) \wedge \dot{\theta_1} \cdot \overrightarrow{z_1}$

$\overrightarrow{V_{O_4 \in 4/0}} = -\dot{L_3} \cdot \overrightarrow{z_3} + -(-L_3 \times \dot{\theta_3} \cdot \overrightarrow{y_3} - L_2 \times \dot{\theta_3} \cdot \overrightarrow{z_3}) + (L_3 \times \dot{\theta_2} \cdot \overrightarrow{y_3} + L_2 \times \dot{\theta_2} \cdot \overrightarrow{z_3} + L_1 \times \dot{\theta_2} \cdot \overrightarrow{z_2}) + -(-L_3 \times \dot{\theta_1} \times (-\sin(\theta_3) \times \cos(\theta_2) - \cos(\theta_3) \times \sin(\theta_2)) \cdot \overrightarrow{x_1} + L_2 \times \dot{\theta_1} \times (\cos(\theta_3) \times \cos(\theta_2) - \sin(\theta_3) \times \sin(\theta_2)) \cdot \overrightarrow{x_1} + L_1 \times \dot{\theta_1} \times \cos(\theta_2) \cdot \overrightarrow{x_1})$

$\overrightarrow{V_{O_4 \in 4/0}} = (-\dot{L_3} \cdot \overrightarrow{z_3} + L_3 \times \dot{\theta_3} \cdot \overrightarrow{y_3} + L_2 \times \dot{\theta_3} \cdot \overrightarrow{z_3} + L_3 \times \dot{\theta_2} \cdot \overrightarrow{y_3} + L_2 \times \dot{\theta_2} \cdot \overrightarrow{z_3} + L_1 \times \dot{\theta_2} \cdot \overrightarrow{z_2} + L_3 \times \dot{\theta_1} \times (-\sin(\theta_3) \times \cos(\theta_2) - \cos(\theta_3) \times \sin(\theta_2)) \cdot \overrightarrow{x_1} - L_2 \times \dot{\theta_1} \times (\cos(\theta_3) \times \cos(\theta_2) - \sin(\theta_3) \times \sin(\theta_2)) \cdot \overrightarrow{x_1} - L_1 \times \dot{\theta_1} \times \cos(\theta_2) \cdot \overrightarrow{x_1})$