Vg is a vector in global and Vl is a vector in local

M is a rotation matrix in create from euler of local in global

$$v_{global} = M_{l|g} . \overrightarrow{v_{local}}$$

V0 is a vector in Zero coordinate system and v1 is vector we have.

M10 is a rotation matrix of vector

$$\overrightarrow{v_0} = M_{rotation} . \overrightarrow{v_1}$$

We have:

$$\overrightarrow{v_0} = M_{global|virtual} . \overrightarrow{v_{global_0}} = M_{global|virtual} . M_{euler_0} \overrightarrow{v_{local_0}}$$
$$\overrightarrow{v_1} = M_{global|virtual} . \overrightarrow{v_{global_1}} = M_{global|virtual} . M_{euler_1} \overrightarrow{v_{local_1}}$$

Thence inferred

$\overrightarrow{v_T}$ is a vector in local coordinate at T pose with euler in IMU is x_T, y_T, z_T

$\overrightarrow{v_1}$ is a vector in local coordinate at 1 pose with euler in IMU is x_1, y_1, z_1

When we roll IMU from T pose to 1 pose we have a rotation matrix D_{T-1}

And we have $\overrightarrow{v_T} = D_{T-1}.\overrightarrow{v_1}$ (1)

In global (earth coordinate system) $\overrightarrow{v_T}$, $\overrightarrow{v_1}$ is $\overrightarrow{v_g}$

$$\overrightarrow{v_g} = D_T \overrightarrow{v_T} = D_1.\overrightarrow{v_1}$$
$$\overrightarrow{v_T} = D_T^{-1}.D_T.\overrightarrow{v_T} = D_T^{-1} D_1.\overrightarrow{v_1} \quad (2)$$

From (1) and (2) we have:

$$D_{T-1} = D_T^{-1} D_1$$

But D_T, D_1, D_{T-1} is rotation matrices in global coordinate.

We need rotation matrix in virtual coordinate (Ox: left, Oy: up, Oz: forward)

Multi by rotation matrix from global to virtual ([90, 0, 90])

$$D_{g-l} = \begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$$

Therefor: $D = D_{g-l}.D_{T-1} = D_{g-l}.D_T^{-1} D_1$

Set $D_0 = D_{g-l}.D_T^{-1}$ we have: $D = D_0.D_1$