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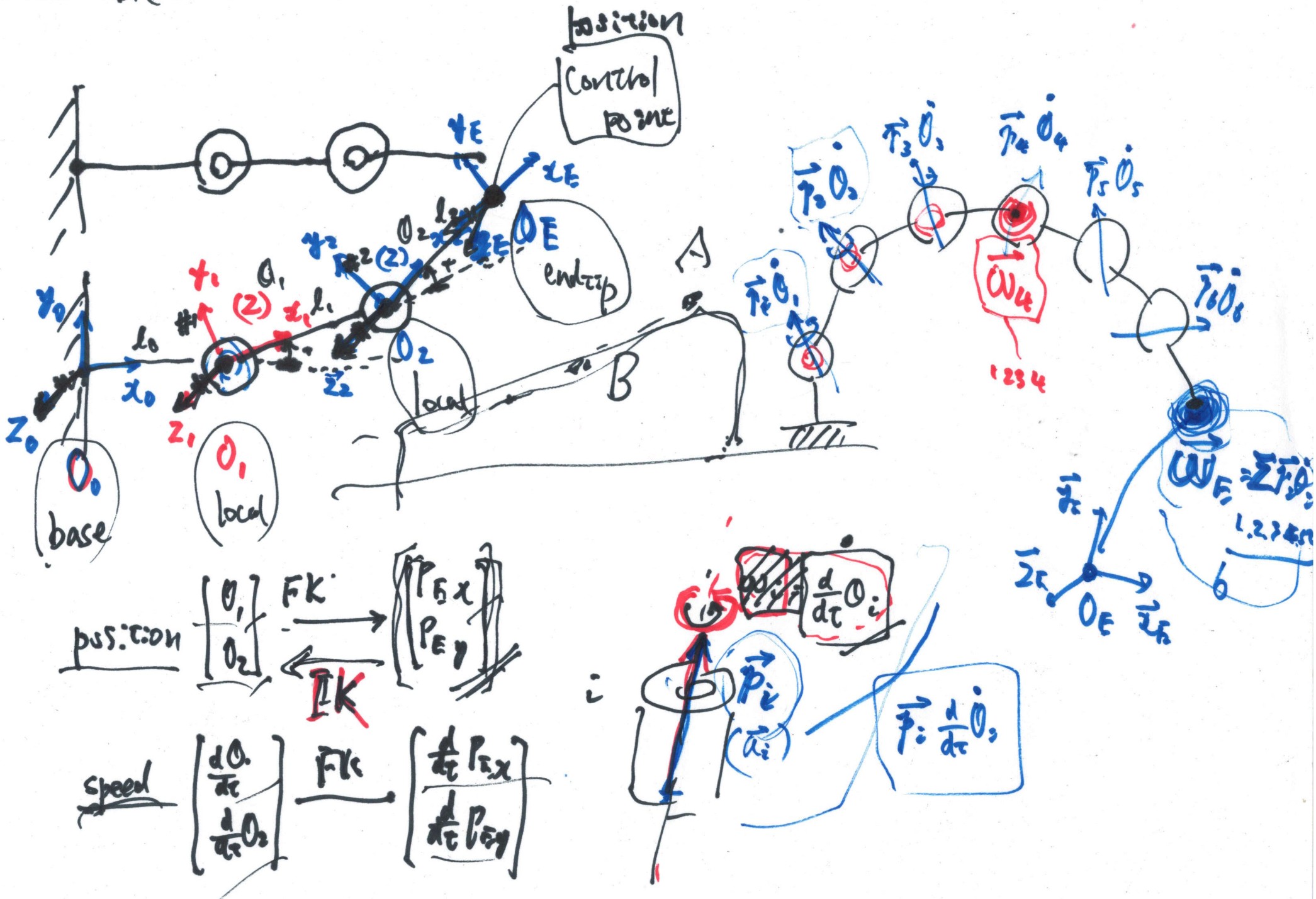


$$\frac{d}{dt}\vec{P}_{(i)} = \frac{d}{dt}\vec{P}_{(i-1)} + \vec{\omega}_{(i-1)} \times \vec{L}_{i-1} \quad (66)$$

O_i

trans spd

O_{i-1}

rot spd

ω_{i-1}

$\frac{d}{dt}\vec{P}_{i-1}$

$\frac{d}{dt}\vec{P}[:]$

$\vec{\omega}[:]$ sig

$\vec{L}_{i-1}$

$i-1$

i

$\vec{L}_{i-1}\sin\alpha'$

$\vec{\omega}_{i-1}$

α

$d\vec{L}$

$\vec{L}_{i-1}$

$i-1$

$\dot{O}_1$
$\dot{O}_2$
$\dot{O}_3$
$\dot{O}_4$
$\dot{O}_5$
$\dot{O}_6$

6x1

FK

$\frac{d}{dt}\vec{P}_{E2}$ = 0

$\frac{d}{dt}\vec{P}_{E1}$

$\frac{d}{dt}\vec{P}_{E2}$

trans 3 vel

ω_{Ex}

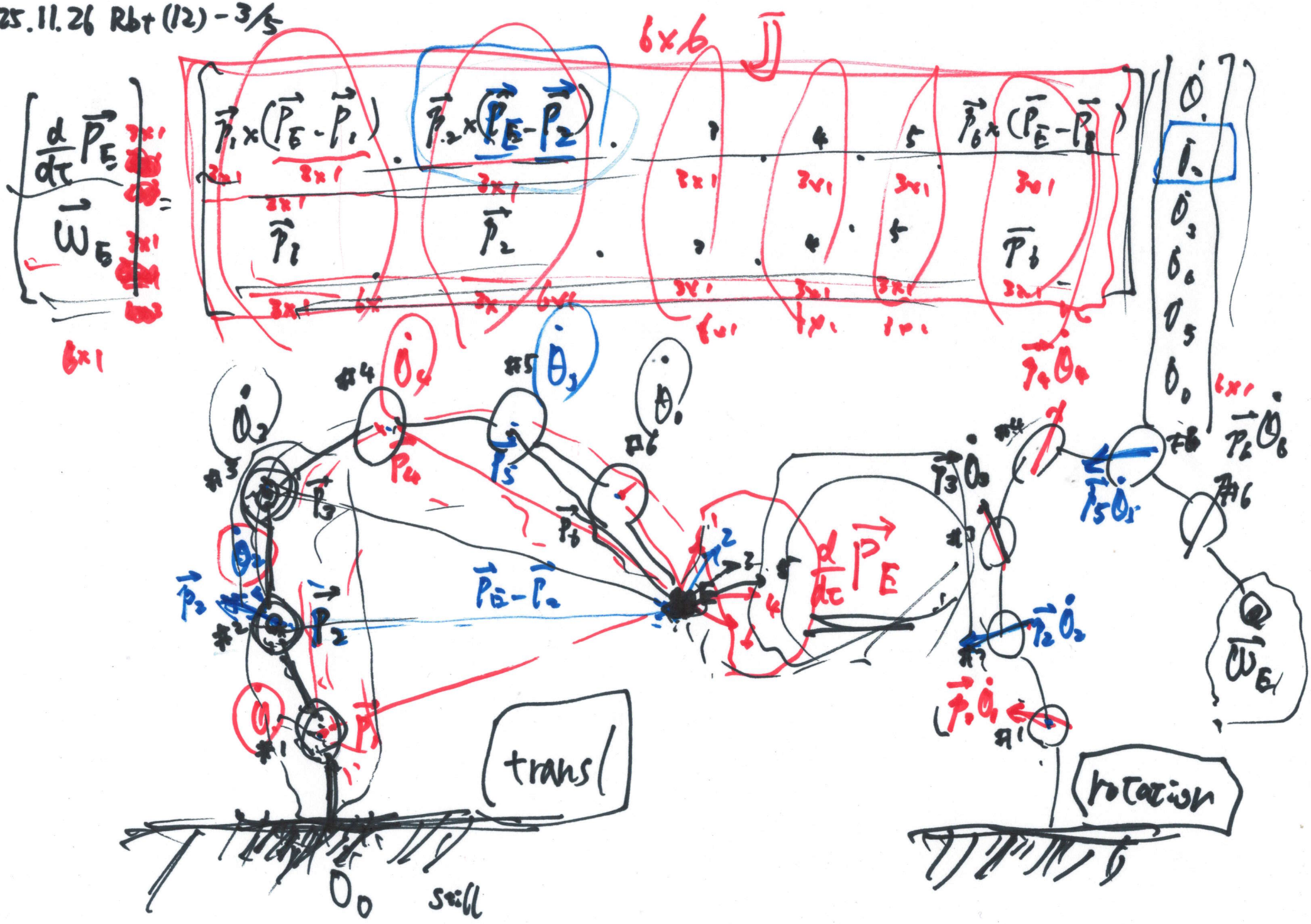
ω_{Ey}

ω_{Ez}

rot 3 vel

6x1

$$\frac{d\vec{L}}{dt} = \vec{\omega} \times \vec{L}$$


6x6
trans
rotation
still

$$\begin{bmatrix} \vec{X}_i & \vec{Y}_i & \vec{Z}_i \end{bmatrix} = \begin{bmatrix} \vec{X}_{i-1} & \vec{Y}_{i-1} & \vec{Z}_{i-1} \end{bmatrix} C_i^{X,Y,Z}$$

$$= \begin{bmatrix} \vec{X}_{i-2} & \vec{Y}_{i-2} & \vec{Z}_{i-2} \end{bmatrix} C_{i-1} C_i$$

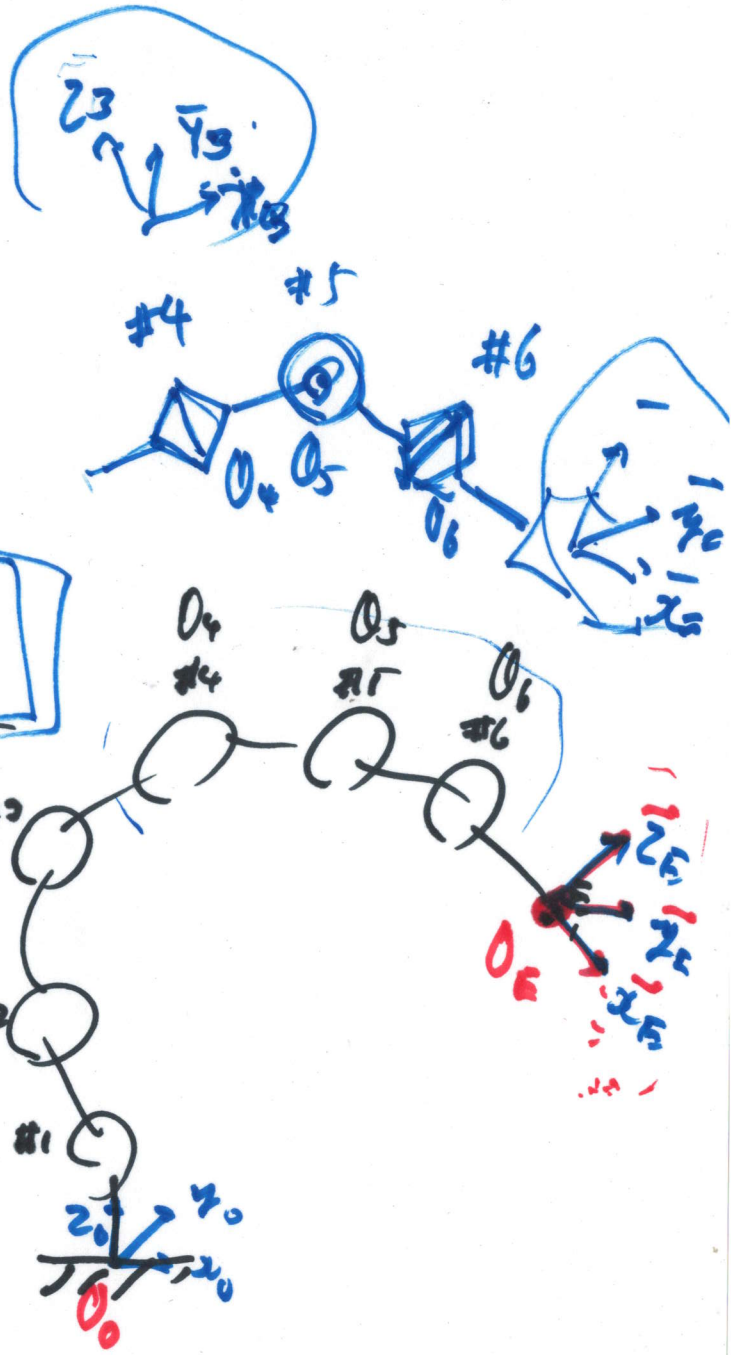
$$= \begin{bmatrix} \vec{X}_0 & \vec{Y}_0 & \vec{Z}_0 \end{bmatrix} C_1 C_2 C_3 \cdots C_i$$

$$= \begin{bmatrix} \vec{X}_0 & \vec{Y}_0 & \vec{Z}_0 \end{bmatrix} {}^0C_i$$

$$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}_i \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}_i \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}_i = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}_0 \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}_0 \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}_0 \begin{bmatrix} C_{11} & C_{12} & C_{13} \\ C_{21} & C_{22} & C_{23} \\ C_{31} & C_{32} & C_{33} \end{bmatrix}$$

local　　base

$$\begin{bmatrix} C_{11} \\ C_{21} \\ C_{31} \end{bmatrix}_0 \quad \begin{bmatrix} C_{21} \\ C_{22} \\ C_{23} \end{bmatrix}_0$$



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