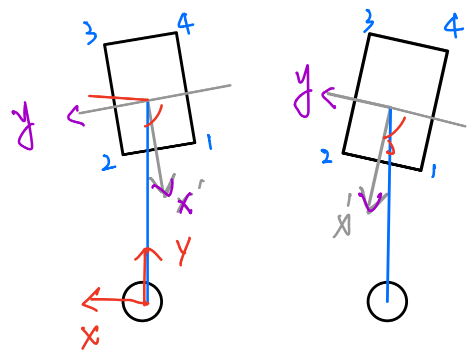
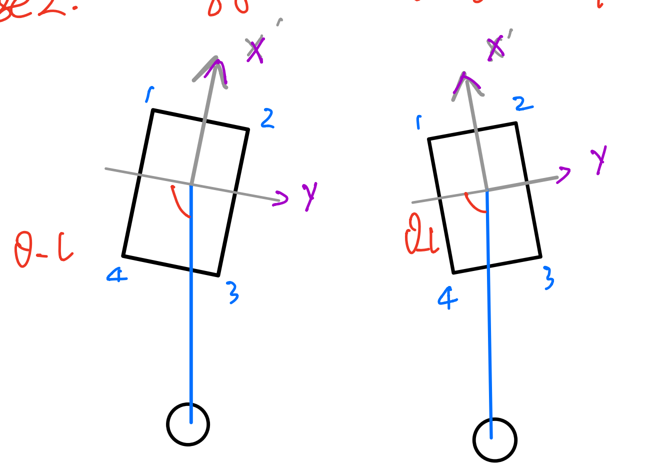
→ theta_local

case1: $-88° < \theta\_local < -92°$



2: [dx . dy, -]   1: [dx, -dy, -]

case2: $88° < \theta\_local < 92°$

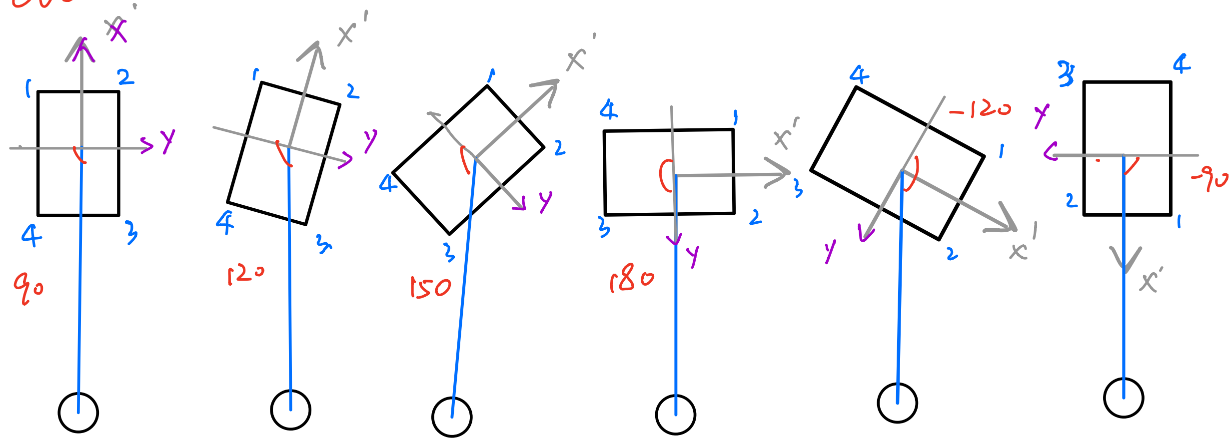


4: [-dx, -dy, -]   3: [-dx. dy, -]

$-180 < \theta\_local \le -90$

case3:

$90 < \theta\_local < 180$



$90 \sim 180$ left: 4 right: 2

4: [-dx, -dy, _]

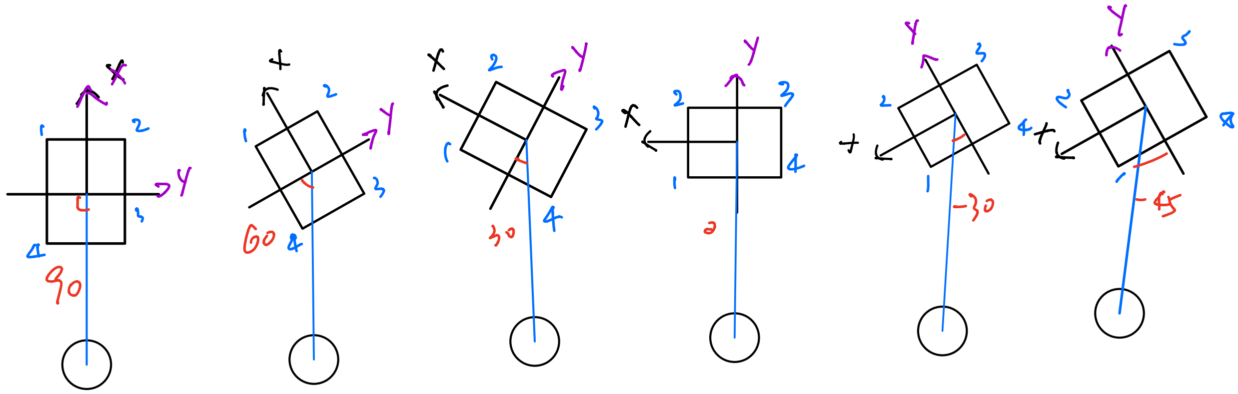
2: [dx, dy, _]

$-180 \sim -90$: left: 3 right: 1

3: [-dx, dy, _]

1: [dx, -dy, _]

case 4. $-90 < \theta\_local < 90$



$0 \sim 90$: left : 1 right : 3

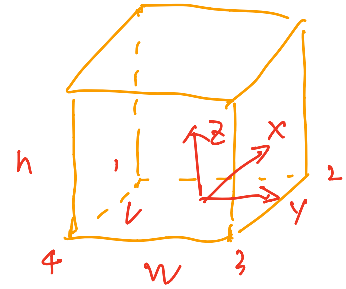
1 : [dx, -dy, -] 3 : [-dx, dy, -]

$-90 \sim 0$ left : 2 . right : 4

2 : [dx. dy. -] 4. [-dx, -dy . -]

$[x_{min}.\quad y_{min}\quad x_{max},\quad y_{max}]$

8 corners : 64 combinitions.



$$\left[\pm\frac{dx}{2},\ \pm\frac{dy}{2},\ \pm\frac{dz}{2}\right]$$

x: l. y: w z: h.

T: $[t_x\ \ t_y\ .\ t_z\ .\ 1]^T$

$$\begin{bmatrix}\lambda x_{min}\\ *\\ \lambda\end{bmatrix} = \underset{3\times3}{K}\,[R\,|\,\underset{3\times1}{T}]\,\left.\begin{bmatrix}X\\ Y\\ Z\\ 1\end{bmatrix}\right\} X_w$$

$$\begin{bmatrix}\lambda x_{min}\\ *\\ \lambda\end{bmatrix} = \underbrace{P_{3\times4}\begin{bmatrix}I & RX_w\\ 0 & 1\end{bmatrix}_{4\times4}}_{M\ 3\times4} T_{4\times1}$$

$$\begin{bmatrix}*\\ \lambda y_{min}\\ \lambda\end{bmatrix} = P_{3\times4}\begin{bmatrix}\overset{3\times3}{I} & \overset{3\times1}{RX_w}\\ 0 & 1\end{bmatrix}_{4\times4} T_{4\times1}$$

$$\begin{bmatrix}\lambda x_{min}\\ *\\ \lambda\end{bmatrix} = M_{3\times4}\,T_{4\times1} = \begin{bmatrix}M[0.\ 0:3] & M[0.3]\\ M[1.\ 0:3] & M[1.3]\\ M[2.\ 0:3] & M[2.3]\end{bmatrix}\begin{bmatrix}T_{3\times1}\\ 1\end{bmatrix}$$

$$= \begin{bmatrix}\overset{1\times3}{M[0.\ 0:3]}\ \overset{3\times1}{T_{3\times1}} + M[0.3]\\ M[1.\ 0:3]\ T_{3\times1} + M[1.3]\\ M[2.\ 0:3]\ T_{3\times1} + M[2.3]\end{bmatrix}$$

$$x_{min} = \frac{M[0,\ 0:3]\ T_{3\times1} + M[0.3]}{M[2,\ 0:3]\ T_{3\times1} + M[2,3]}$$

$$\left(x_{min} M[2,\ 0:3] - M[0,\ 0:3] \right) T_{3\times1} = M[0.3] - x_{min} M[2.3]$$

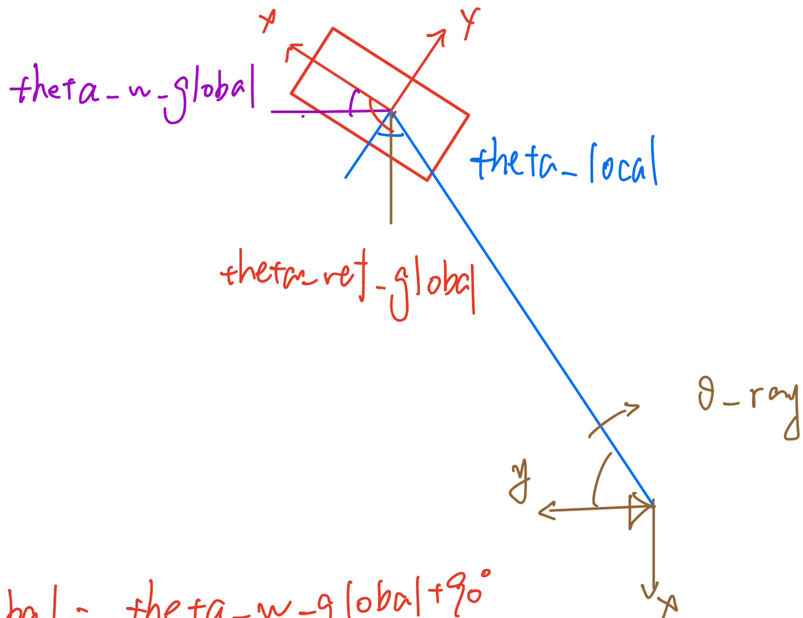
$$(M[0.\ 0:3] - x_{min} M[2,\ 0:3])\ T_{3\times1} = x_{min} M[2.3] - M[0.3]$$

$$M[1.\ 0:3] - y_{min} M[2,\ 0:3]\ T_{3\times1} = x_{min} M[2.3] - M[1,3]$$

$$M[0.\ 0:3] - x_{max} M[2.\ 0:3]\ T_{3\times1} = x_{max} M[2.3] - M[0.3]$$

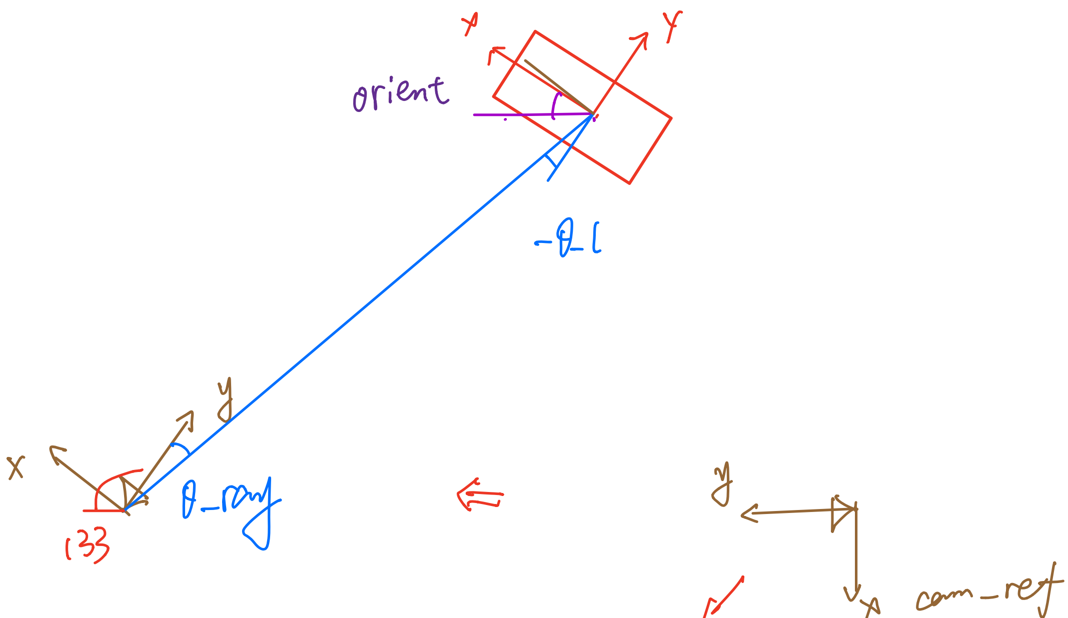
$$M[1.\ 0:3] - y_{max} M[2.\ 0:3]\ T_{3\times1} = y_{max} M[2.3] - M[1.3]$$

$$A_{4\times3}\ T_{3\times1} = b_{4\times1}$$



theta_ref_global = theta_w_global + 90°

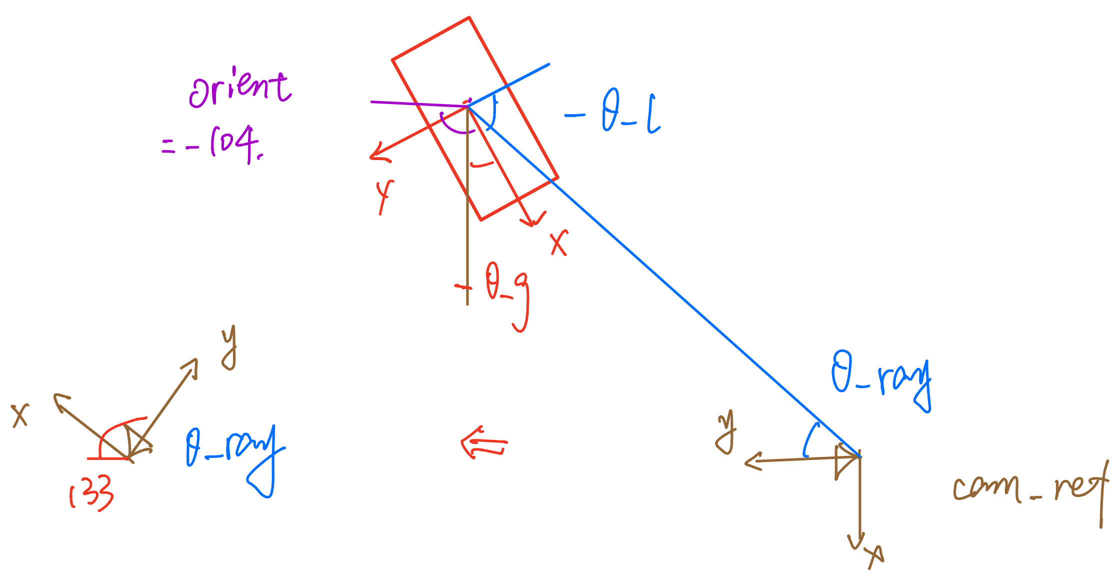
theta_ref_global = theta_local + θ_ray



$\theta\_g = orient + 90 = 136$

$\Downarrow$

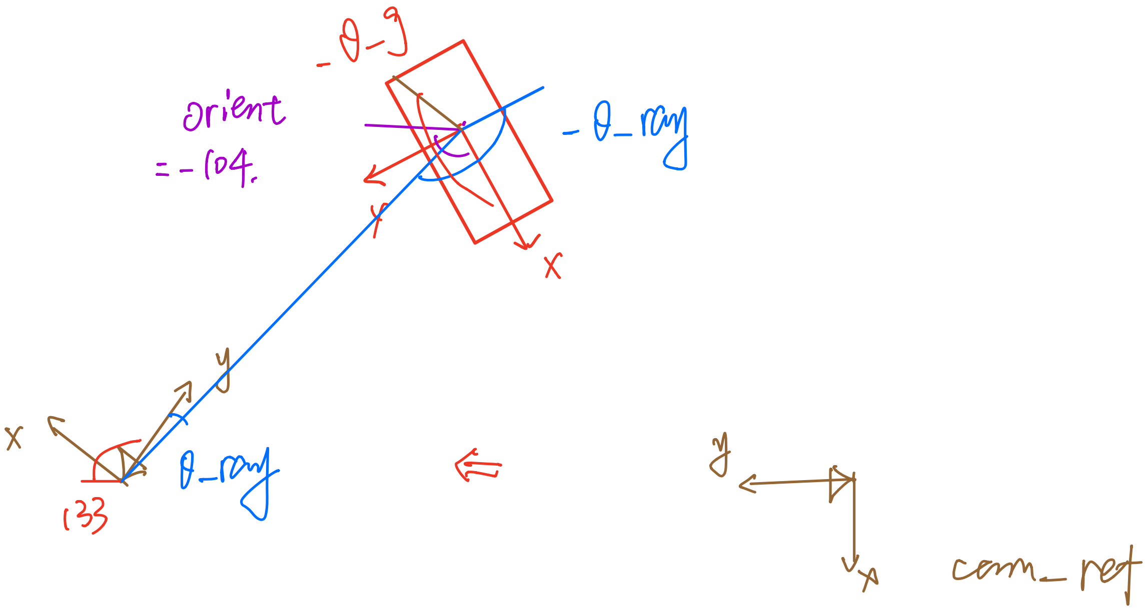
$\theta\_g = \theta\_g - 133 = -3$



$\theta\_g = orient + \frac{\pi}{2} = -14$

$$\left(\frac{\pi}{2} - \theta\_ray\right) - \left(\frac{\pi}{2} + \theta\_l\right) = \theta\_g$$

$$\theta\_l + \theta\_ray = \theta\_g$$



$$\theta\_g = \theta\_g - 133 = -14 - 133 = -157$$

☆ $\theta\_g = orient + \frac{\pi}{2}$

$$\theta\_g = \theta\_g - R\_z$$

$$\theta\_l = \theta\_g - \theta\_ray$$