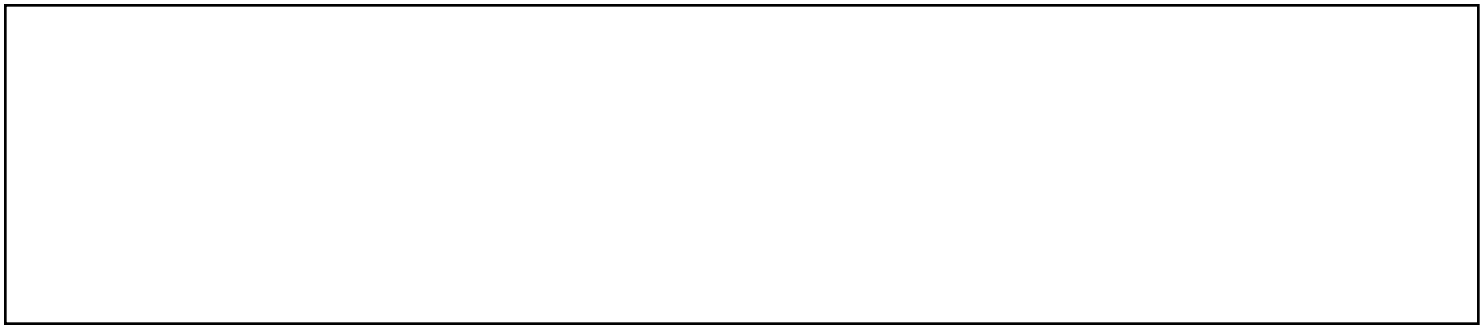
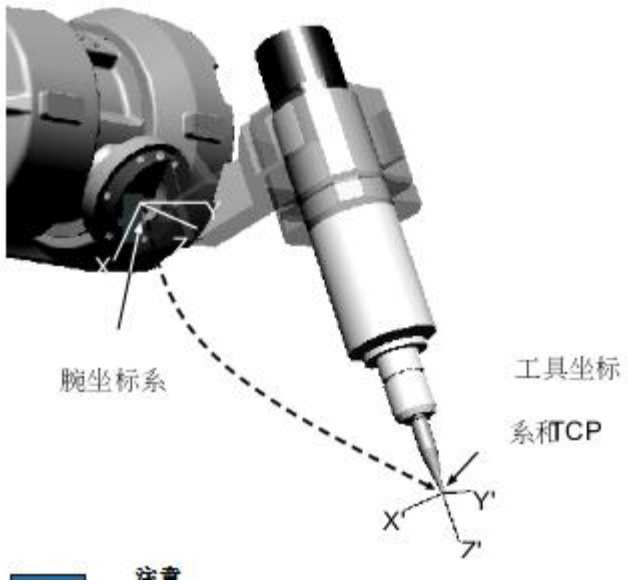
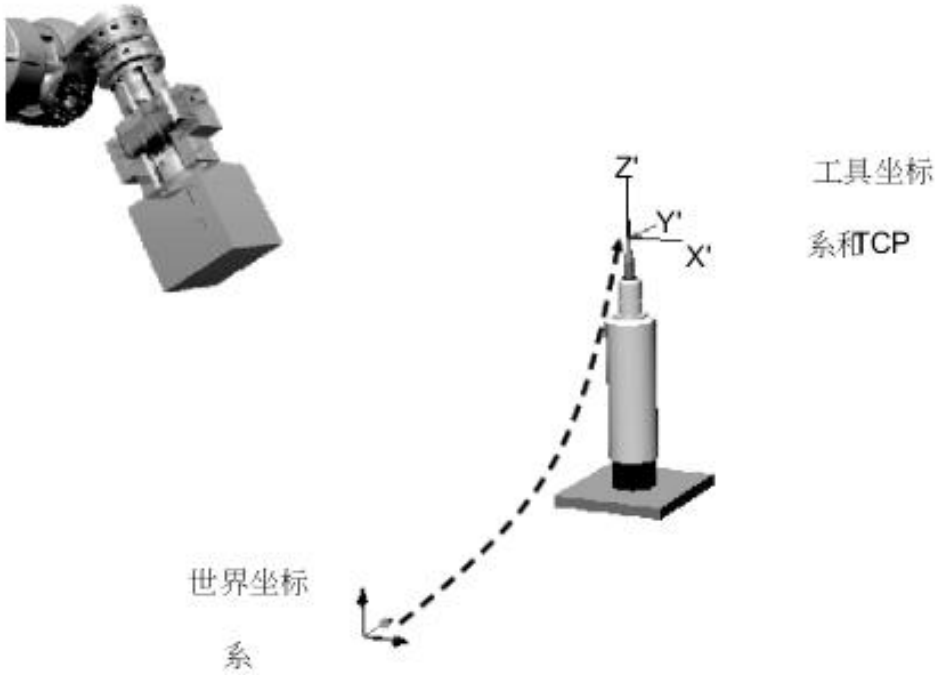
to

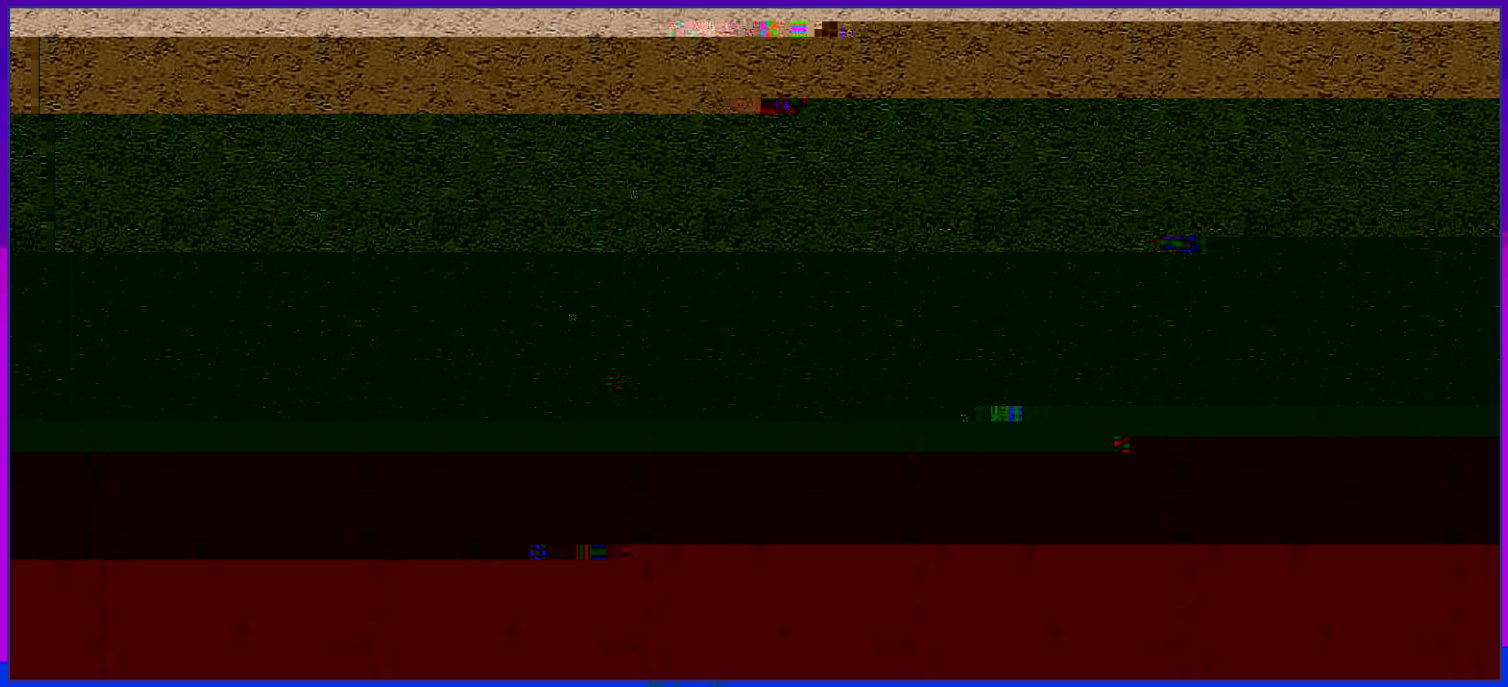



腕坐标系
工具坐标
系和TCP
X'
Y'
Z'


Z'
Y'
X'
工具坐标
系和TCP
世界坐标
系

tload

固定工具



将工具、gripper的TCP调整至沿z方向225.2处。

警告

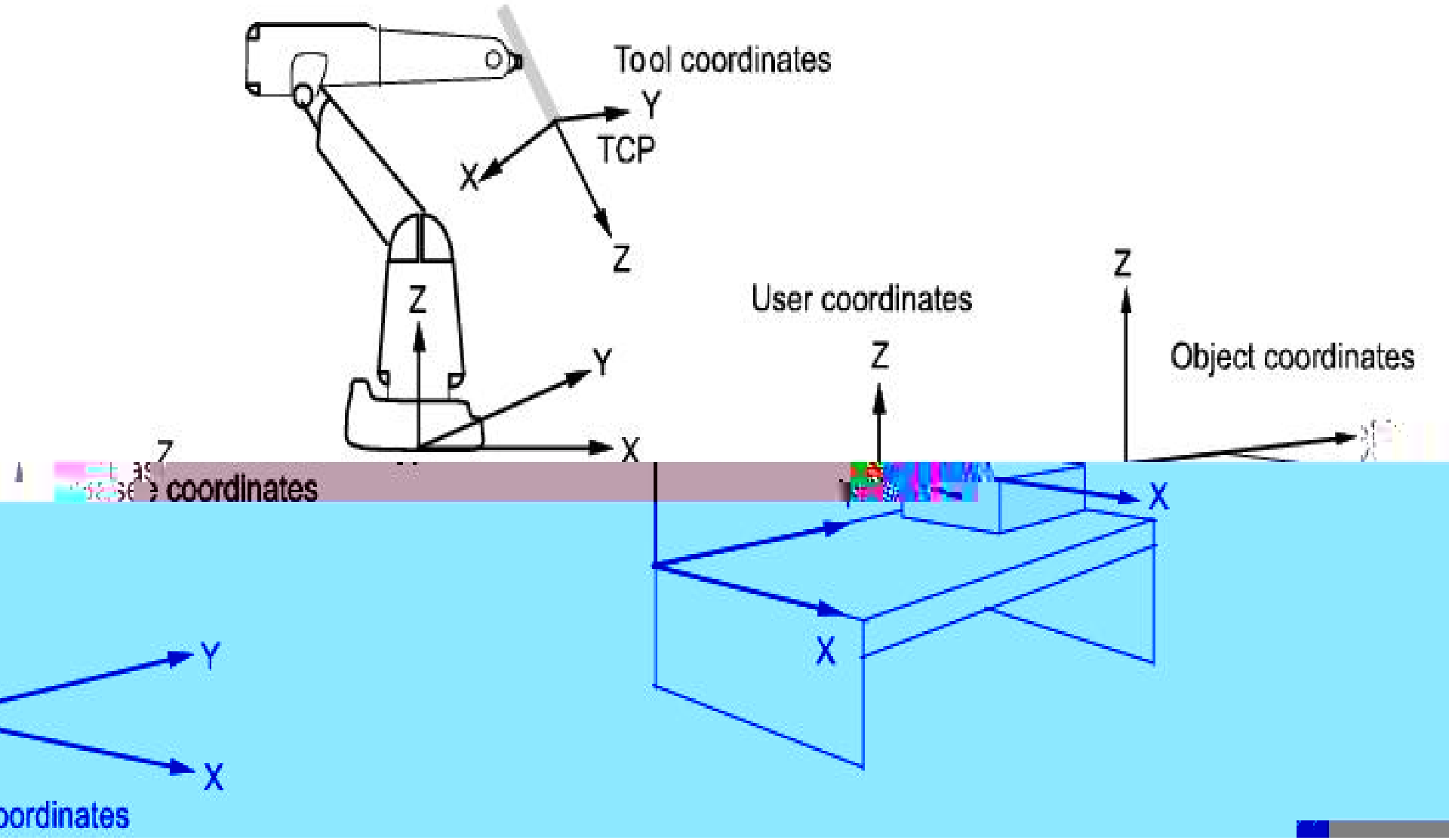
-
-
-

-
-
-

robhold

ufprog

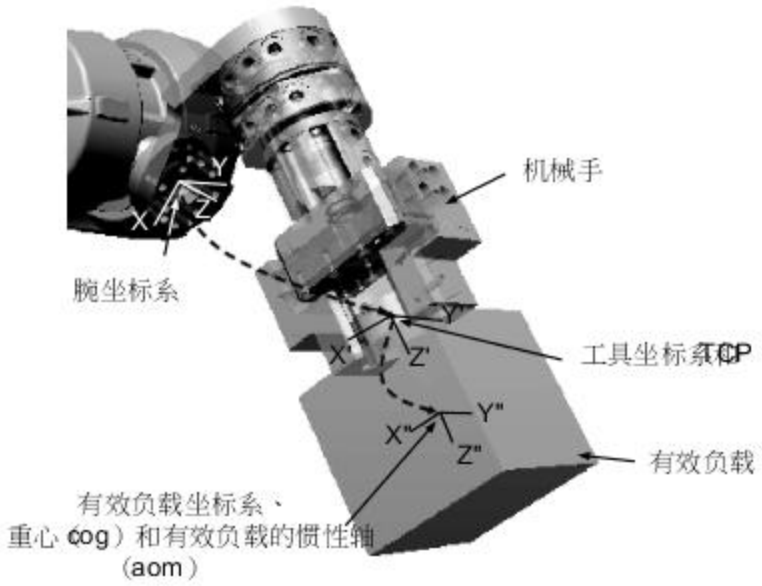
在用户坐标系中定义目标坐标系。



loadd

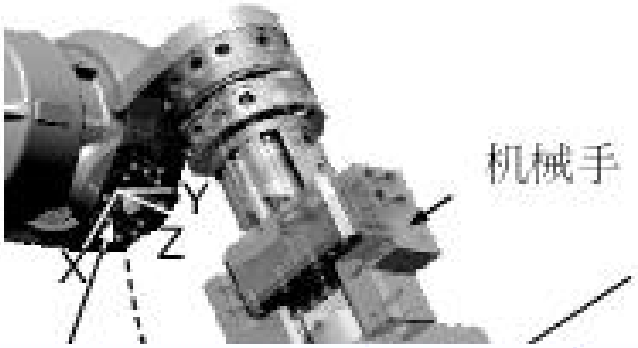
mass

cog


机械手
Y
X
Z
腕坐标系
Y'
X'
Z'
工具坐标系和TCP
Y"
X"
Z"
有效负载
有效负载坐标系、
重心（cog）和有效负载的惯性轴
（aom）

如果使用固定工具，则用目标坐标系来表示矩轴。

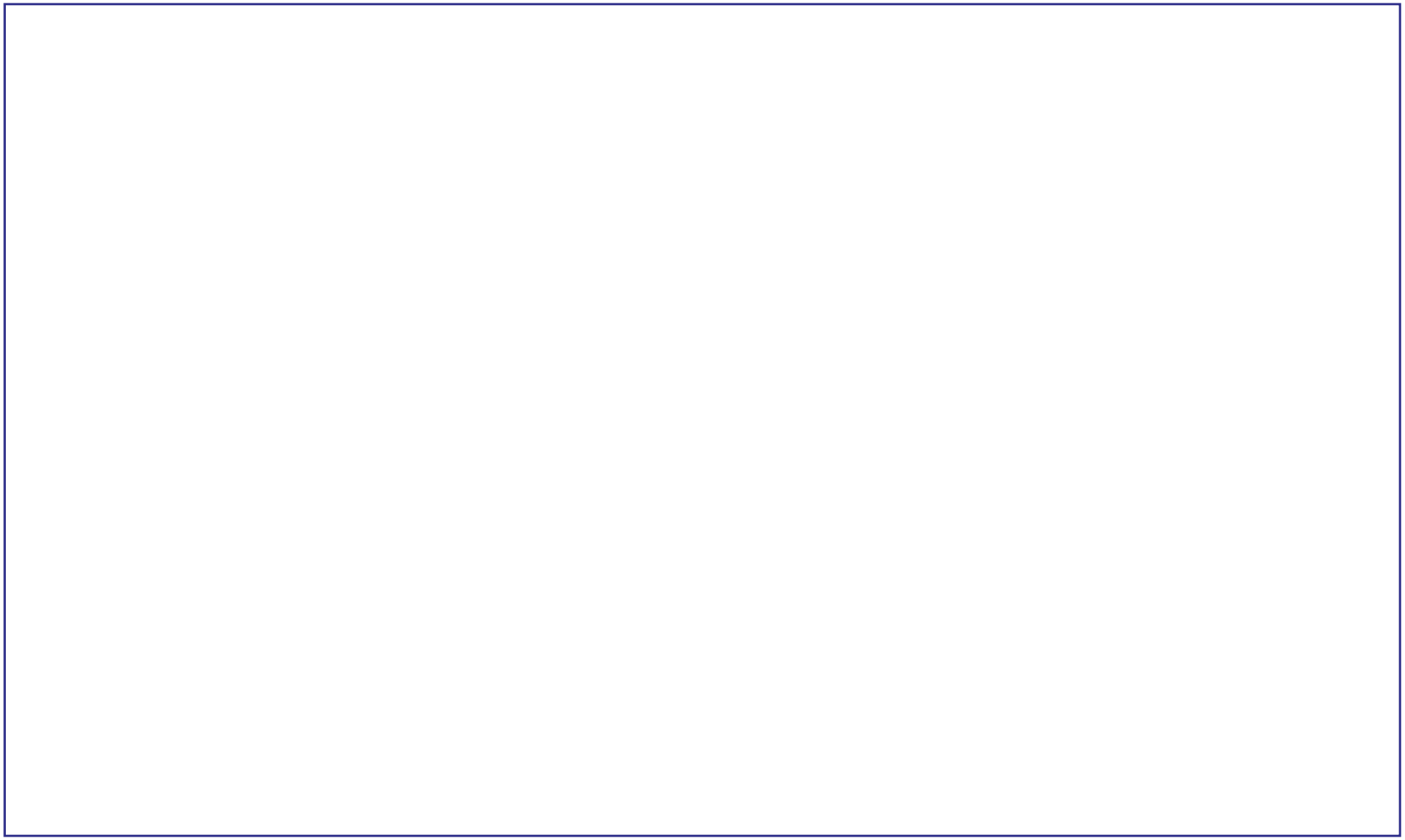
固定工具

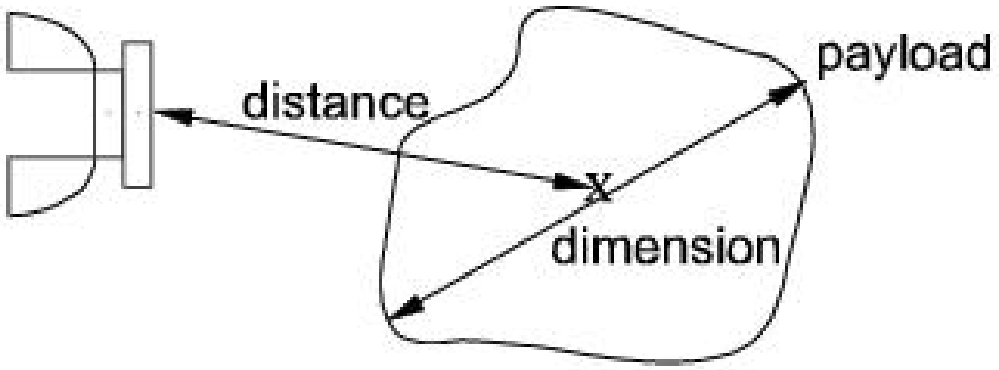


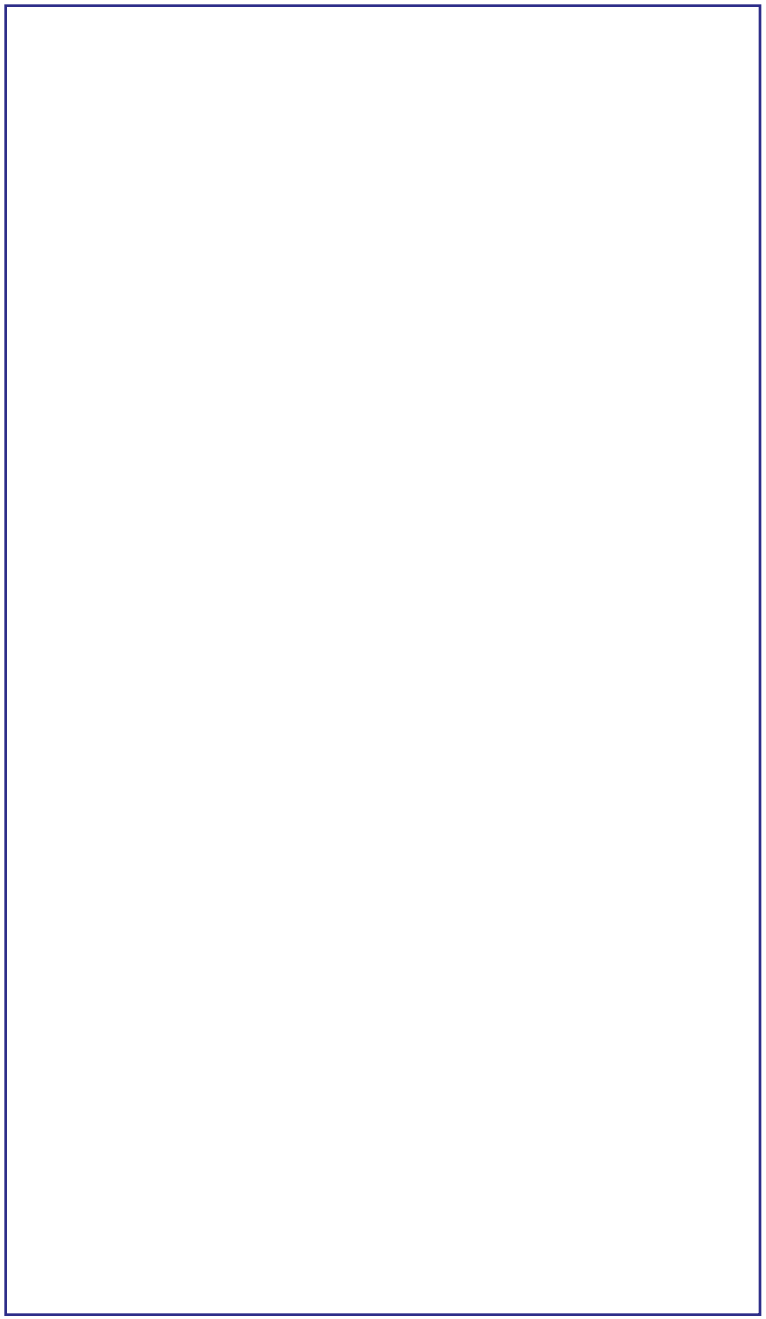
机械手

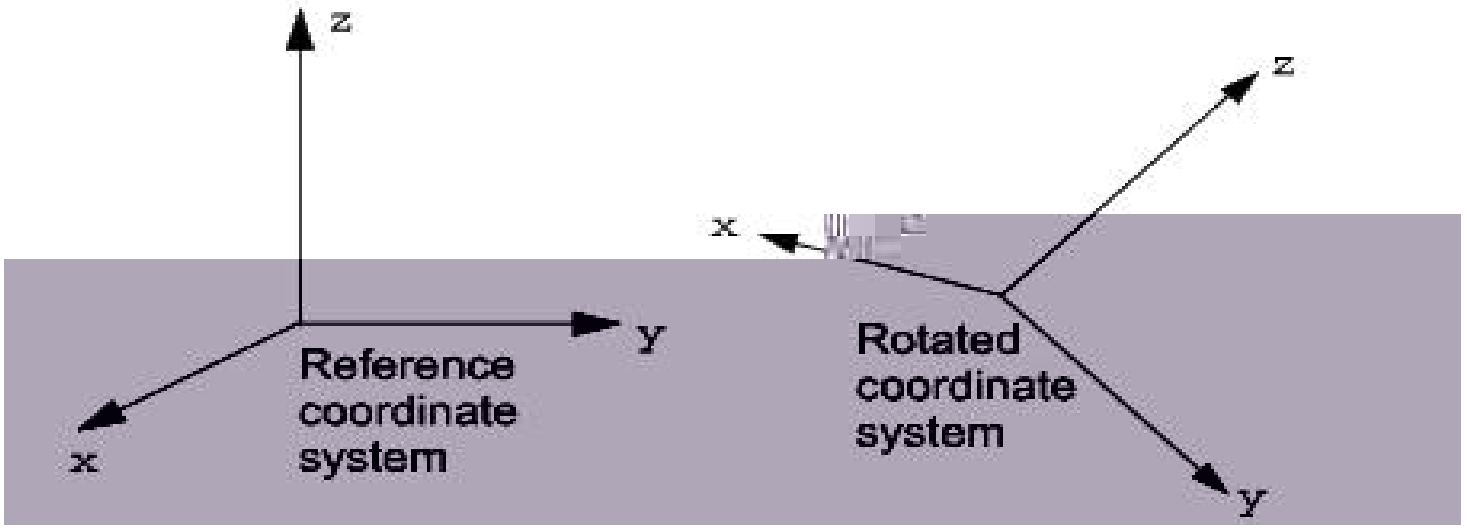
有效负载坐标系、

重心 cog）和有效负载的惯性轴




payload
distance
x
dimension



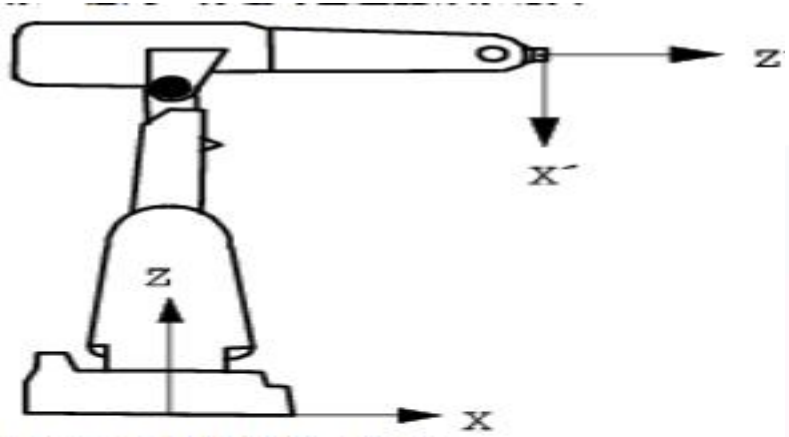

z
y
x
Reference
coordinate
system
z
x
Rotated
coordinate
system
y

q1 = $\frac{\sqrt{x_1+y_2+z_3+1}}{2}$

q2 = $\frac{\sqrt{x_1-y_2-z_3+1}}{2}$

q3 = $\frac{\sqrt{y_2-x_1-z_3+1}}{2}$

q4 = $\frac{\sqrt{z_3-x_1-y_2+1}}{2}$



随后，各轴将相关，如下：

$x'=-z=(0,\ 0,\ -1)$

$y'=y=(0,\ 1,\ 0)$

$z'=x=(1,\ 0,\ 0)$

哪一个相当于以下旋转矩阵：

$$\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ -1 & 0 & 0 \end{bmatrix}$$

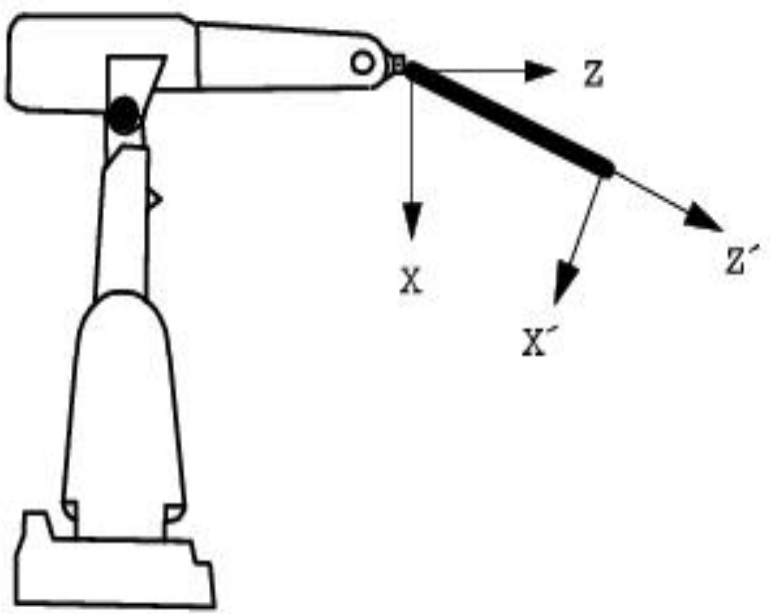
旋转矩阵提供相应的四元数：

$$q1 = \frac{\sqrt{0+1+0+1}}{2} = \frac{\sqrt{2}}{2} = 0.707$$

$$q2 = \frac{\sqrt{0-1-0+1}}{2} = 0$$

$$q3 = \frac{\sqrt{1-0-0+1}}{2} = \frac{\sqrt{2}}{2} = 0.707$$

$$q4 = \frac{\sqrt{0-0-1+1}}{2} = 0$$



$$\begin{bmatrix} \cos 30^\circ & 0 & \sin 30^\circ \\ 0 & 1 & 0 \\ -\sin 30^\circ & 0 & \cos 30^\circ \end{bmatrix}$$

$$q1 = \frac{\sqrt{cos30^\circ + 1 + cos30^\circ + 1}}{2} = 0.965926$$

$$q2 = \frac{\sqrt{cos30^\circ - 1 - cos30^\circ + 1}}{2} = 0$$

$$q3 = \frac{\sqrt{1 - cos30^\circ - cos30^\circ + 1}}{2} = 0.258819$$

$$q4 = \frac{\sqrt{cos30^\circ - cos30^\circ - 1 + 1}}{2} = 0$$