$$Q_{x1} - \alpha Q_{y1} + \beta Q_{z1} + t_x = P_{x1} \longrightarrow (6)$$

$$\alpha Q_{x1} + Q_{y1} - \gamma Q_{z1} + t_y = P_{y1} \longrightarrow (7).$$

$$-\beta Q_{x1} + \gamma Q_{y1} + Q_{z1} + t_z = P_{z1} \longrightarrow (8).$$

$$\begin{bmatrix} -Q_{y1} & Q_{z1} & 0 & 1 & 0 & 0 \\ Q_{x1} & 0 & -Q_{z1} & 0 & 1 & 0 \\ 0 & -Q_{x1} & Q_{y1} & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \alpha \\ \beta \\ \gamma \\ t_x \\ t_y \\ t_z \end{bmatrix} = \begin{bmatrix} P_{x1} - Q_{x1} \\ P_{y1} - Q_{y1} \\ P_{z1} - Q_{z1} \end{bmatrix} \longrightarrow (9).$$

$$A_{3\times6} \quad X_{6\times1} = b_{3\times1}.$$

If there are n such correspondences stack up the A matrix such that.

$$\begin{bmatrix} A^1_{3\times6} \\ A^2_{3\times6} \\ \vdots \\ A^n_{3\times6} \end{bmatrix} X_{6\times1} = \begin{bmatrix} b^1_{3\times1} \\ b^2_{3\times1} \\ \vdots \\ b^n_{3\times1} \end{bmatrix} \longrightarrow (10)$$

$$(3n\times6)\times(6\times1) = (3n\times1)$$

$\cancel{Ax = b}$

Or $\boxed{A_{3n\times6} X_{6\times1} = b_{3n\times1}}$.

Pseudo inverse / SVD to solve for x.