given

- $p_i \in \mathbb{R}^3$:points on lines
- $d_i \in \mathbb{R}^3$:unit directions along lines

$$k_i = (p_i - (p_i \cdot d_i) \cdot d_i)$$

$$a_i = \begin{bmatrix} 1 & 0 & 0 \end{bmatrix}^T - d_{i,0} \cdot d_i$$

$$b_i = \begin{bmatrix} 0 & 1 & 0 \end{bmatrix}^T - d_{i,1} \cdot d_i$$

$$c_i = \begin{bmatrix} 0 & 0 & 1 \end{bmatrix}^T - d_{i,2} \cdot d_i$$

$$M = \begin{bmatrix} (\sum_i (a_{i,0} - d_{i,0} \cdot (d_i \cdot a_i))) & (\sum_i (a_{i,1} - d_{i,1} \cdot (d_i \cdot a_i))) & (\sum_i (a_{i,2} - d_{i,2} \cdot (d_i \cdot a_i))) \\ (\sum_i (b_{i,0} - d_{i,0} \cdot (d_i \cdot b_i))) & (\sum_i (b_{i,1} - d_{i,1} \cdot (d_i \cdot b_i))) & (\sum_i (b_{i,2} - d_{i,2} \cdot (d_i \cdot b_i))) \\ (\sum_i (c_{i,0} - d_{i,0} \cdot (d_i \cdot c_i))) & (\sum_i (c_{i,1} - d_{i,1} \cdot (d_i \cdot c_i))) & (\sum_i (c_{i,2} - d_{i,2} \cdot (d_i \cdot c_i))) \end{bmatrix}$$

$$r = \begin{bmatrix} \sum_i (k_i \cdot a_i) \\ \sum_i (k_i \cdot b_i) \\ \sum_i (k_i \cdot c_i) \end{bmatrix}$$

$$q = M^{-1} \cdot r$$