$$p_i = poly_{i,*}$$

$$q_i = poly2_{i*}$$

$$d_i = p_i - q_i$$

$$\begin{split} H = \sum_{i} \frac{1}{\|d_{i}\|_{2}} \begin{bmatrix} d_{i,2}^{2} + d_{i,3}^{2} & -d_{i,1} \cdot d_{i,2} & -d_{i,1} \cdot d_{i,3} \\ -d_{i,1} \cdot d_{i,2} & d_{i,1}^{2} + d_{i,3}^{2} & -d_{i,2} \cdot d_{i,3} \\ -d_{i,1} \cdot d_{i,3} & -d_{i,2} \cdot d_{i,3} & d_{i,1}^{2} + d_{i,2}^{2} \end{bmatrix} \\ \mathcal{J} = \sum_{i} \frac{1}{\|d_{i}\|_{2}} \begin{bmatrix} -d_{i,2} \cdot p_{i,2} \cdot q_{i,1} - d_{i,3} \cdot p_{i,3} \cdot q_{i,1} + d_{i,2} \cdot p_{i,1} \cdot q_{i,2} + d_{i,3} \cdot p_{i,1} \cdot q_{i,3} \\ d_{i,1} \cdot p_{i,2} \cdot q_{i,1} - d_{i,1} \cdot p_{i,1} \cdot q_{i,2} - d_{i,3} \cdot p_{i,3} \cdot q_{i,2} + d_{i,3} \cdot p_{i,2} \cdot q_{i,3} \\ d_{i,1} \cdot p_{i,3} \cdot q_{i,1} + d_{i,2} \cdot p_{i,3} \cdot q_{i,2} - d_{i,1} \cdot p_{i,1} \cdot q_{i,3} - d_{i,2} \cdot p_{i,2} \cdot q_{i,3} \end{bmatrix} \end{split}$$

where

- $poly \in \mathbb{R}^{n \times 3}$
- $poly2 \in \mathbb{R}^{n \times 3}$