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

$$q_i = poly2_{i,*}$$

$$d_i = p_i - q_i$$

$$H = \sum_i \frac{1}{\|d_i\|_2} \begin{bmatrix} d_{i,2}{}^2 + d_{i,3}{}^2 & -d_{i,1} \cdot d_{i,2} & -d_{i,1} \cdot d_{i,3} \\ -d_{i,1} \cdot d_{i,2} & d_{i,1}{}^2 + d_{i,3}{}^2 & -d_{i,2} \cdot d_{i,3} \\ -d_{i,1} \cdot d_{i,3} & -d_{i,2} \cdot d_{i,3} & d_{i,1}{}^2 + d_{i,2}{}^2 \end{bmatrix}$$

$$\mathcal{J} = \sum_i \frac{1}{\|d_i\|_2} \begin{bmatrix} -d_{i,2} \cdot p_{i,2} \cdot q_{i,1} - d_{i,3} \cdot p_{i,3} \cdot q_{i,1} + d_{i,2} \cdot p_{i,1} \cdot q_{i,2} + d_{i,3} \cdot p_{i,1} \cdot q_{i,3} \\ d_{i,1} \cdot p_{i,2} \cdot q_{i,1} - d_{i,1} \cdot p_{i,1} \cdot q_{i,2} - d_{i,3} \cdot p_{i,3} \cdot q_{i,2} + d_{i,3} \cdot p_{i,2} \cdot q_{i,3} \\ d_{i,1} \cdot p_{i,3} \cdot q_{i,1} + d_{i,2} \cdot p_{i,3} \cdot q_{i,2} - d_{i,1} \cdot p_{i,1} \cdot q_{i,3} - d_{i,2} \cdot p_{i,2} \cdot q_{i,3} \end{bmatrix}$$

where

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