$$
\begin{aligned}
p_i =& poly_{i,*} \\
q_i =& poly2_{i,*} \\
d_i =& p_i - q_i \\
H =& \sum_i \frac{1}{\|d_i\|_2} \begin{bmatrix} d_{i,2}^2 + d_{i,3}^2 & -d_{i,1} \cdot d_{i,2} & -d_{i,1} \cdot d_{i,3} \\ -d_{i,1} \cdot d_{i,2} & d_{i,1}^2 + d_{i,3}^2 & -d_{i,2} \cdot d_{i,3} \\ -d_{i,1} \cdot d_{i,3} & -d_{i,2} \cdot d_{i,3} & d_{i,1}^2 + d_{i,2}^2 \end{bmatrix} \\
\mathcal{J} =& \sum_i \frac{1}{\|d_i\|_2} \begin{bmatrix} -d_{i,2} \cdot p_{i,2} \cdot q_{i,1} - d_{i,3} \cdot p_{i,3} \cdot q_{i,1} + d_{i,2} \cdot p_{i,1} \cdot q_{i,2} + d_{i,3} \cdot p_{i,1} \cdot q_{i,3} \\ d_{i,1} \cdot p_{i,2} \cdot q_{i,1} - d_{i,1} \cdot p_{i,1} \cdot q_{i,2} - d_{i,3} \cdot p_{i,3} \cdot q_{i,2} + d_{i,3} \cdot p_{i,2} \cdot q_{i,3} \\ d_{i,1} \cdot p_{i,3} \cdot q_{i,1} + d_{i,2} \cdot p_{i,3} \cdot q_{i,2} - d_{i,1} \cdot p_{i,1} \cdot q_{i,3} - d_{i,2} \cdot p_{i,2} \cdot q_{i,3} \end{bmatrix}
\end{aligned}
$$

where

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