ElementSets from MeshConnectivity

VertexOneRing, Faces from Neighborhoods(M)

$$
\begin{aligned}
&M: \text{ TriangleMesh}\\
&x_i \in \mathbb{R}^3
\end{aligned}
$$

$$V, E, F = \mathit{ElementSets}(M)$$

$$\mathit{UpdateStep}(i, j, k, d) = \begin{cases} p & \text{if } s_{1,1} < 0 \text{ and } s_{2,1} < 0 \\ \min\left(d_j + \left\|x_j - x_i\right\|, d_k + \left\|x_k - x_i\right\|\right) & \text{otherwise} \end{cases}$$

where

$$
\begin{aligned}
&i, j, k \in V\\
&d_i \in \mathbb{R}\\
&X = \begin{bmatrix} x_j - x_i & x_k - x_i \end{bmatrix}\\
&t = \begin{bmatrix} d_j & d_k \end{bmatrix}^T\\
&Q = \left(X^T \; X\right)^{-1}\\
&1 = \begin{bmatrix} 1 \\ 1 \end{bmatrix}\\
&p = \frac{1^T \; Q \; t + \sqrt{\left(1^T \; Q \; t\right)^2 - 1^T \; Q \; 1 \cdot \left(t^T \; Q \; t - 1\right)}}{1^T \; Q \; 1}\\
&n = X \; Q \; \left(t - p \cdot 1\right)\\
&s = Q \; X^T \; n
\end{aligned}
$$

$$\mathit{GetNextLevel}(U) = v - s$$

where

$$
\begin{aligned}
&U_i \subset V\\
&s = \bigcup_i U_i\\
&v = \mathit{VertexOneRing}(s)
\end{aligned}
$$

$$\mathit{GetRangeLevel}(U, a, b) = \bigcup_{i=a}^{b} U_i \text{ where } U_j \subset V, a, b \in \mathbb{Z}, \text{ index}$$

$$\mathit{GetLevelSequence}(U) = \begin{cases} \mathit{sequence}(U, \mathit{next}) & \text{if } |\mathit{next}| \neq 0 \\ U & \text{otherwise} \end{cases}$$

where

$$
\begin{aligned}
&U_i \subset V\\
&\mathit{next} = \mathit{GetNextLevel}(U)
\end{aligned}
$$