

ElementSets from MeshConnectivity

VertexOneRing, Faces, NeighborVerticesInFace from Neighborhoods(M)

$M : \text{TriangleMesh}$

$x_i \in \mathbb{R}^3$

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

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

where

$i, j, k \in V$

$d_i \in \mathbb{R}$

$X = [x_j - x_i \quad x_k - x_i]$

$t = [d_j \quad d_k]^T$

$Q = (X^T X)^{-1}$

$1 = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$

$p = \frac{1^T Q t + \sqrt{(1^T Q t)^2 - 1^T Q 1 \cdot (t^T Q t - 1)}}{1^T Q 1}$

$n = XQ(t - p \cdot 1)$

$s = QX^T n$

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

where

$U_i \subset V$

$s = \bigcup_i U_i$

$v = \text{VertexOneRing}(s)$

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

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

where

$U_i \subset V$

$\text{next} = \text{GetNextLevel}(U)$