arccos, atan2 from trigonometry

ElementSets from MeshConnectivity

Faces, OrientedOppositeFaces, VertexOneRing, NeighborVerticesInFace, OrientedVertices from Neighborhoods(M)

M : TriangleMesh
$x_i \in \mathbb{R}^3$

$V, E, F = ElementSets(M)$

$\theta(i, f) = arccos\left(\dfrac{(x_j - x_i) \cdot (x_k - x_i)}{\|x_j - x_i\|\|x_k - x_i\|} \right)$

where

$i \in V$
$f \in F$
$j, k = NeighborVerticesInFace(f, i)$

$K(i) = 2\pi - \displaystyle\sum_{f \in Faces(i)} \theta_{i,f}$ where $i \in V$

$area(f) = \frac{1}{2}\|(x_j - x_i) \times (x_k - x_i)\|$

where

$f \in F$
$i, j, k = OrientedVertices(f)$

$N(f) = \dfrac{(x_j - x_i) \times (x_k - x_i)}{2area(f)}$

where

$f \in F$
$i, j, k = OrientedVertices(f)$

$l(i, j) = \|x_j - x_i\|$ where $i, j \in V$

$\phi(i, j) = atan2(e \cdot (n_1 \times n_2), n_1 \cdot n_2)$

where

$i, j \in V$
$e = \dfrac{x_j - x_i}{\|x_j - x_i\|}$
$f_1, f_2 = OrientedOppositeFaces(i, j)$
$n_1 = N(f_1)$
$n_2 = N(f_2)$

$H(i) = \dfrac{1}{4} \displaystyle\sum_{j \in VertexOneRing(i)} l_{i,j}\phi_{i,j}$ where $i \in V$