

atan2 from trigonometry

ElementSets from MeshConnectivity

OrientedVertices from Neighborhoods(M)

$M : \text{FaceMesh}$

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

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

$$\Omega_f(\mathbf{p}) = 2\text{atan2}(|[\mathbf{a} \ \mathbf{b} \ \mathbf{c}]|, (abc + (\mathbf{a} \cdot \mathbf{b})c + (\mathbf{b} \cdot \mathbf{c})a + (\mathbf{c} \cdot \mathbf{a})b))$$

where

$$f \in F$$

$$\mathbf{p} \in \mathbb{R}^3$$

$$\mathbf{a} = x_i - \mathbf{p}$$

$$\mathbf{b} = x_j - \mathbf{p}$$

$$\mathbf{c} = x_k - \mathbf{p}$$

$$a = \|\mathbf{a}\|$$

$$b = \|\mathbf{b}\|$$

$$c = \|\mathbf{c}\|$$

$$i, j, k = \text{OrientedVertices}(f)$$

$$w(\mathbf{p}) = \frac{1}{4\pi} \sum_{f \in F} \Omega_f(\mathbf{p}) \text{ where } \mathbf{p} \in \mathbb{R}^3$$