

atan2 from trigonometry

ElementSets from MeshConnectivity

OrientedVertices from Neighborhoods(*M*)

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

$$V, E, F = \text{ElementSets}(M)$$
$$\Omega_f(p) = 2 \operatorname{atan2}(|[\mathbf{a} \ \mathbf{b} \ \mathbf{c}]|, (a \ b \ c + (\mathbf{a} \cdot \mathbf{b}) \ c + (\mathbf{b} \cdot \mathbf{c}) \ a + (\mathbf{c} \cdot \mathbf{a}) \ b))$$

where

$$f \in F$$

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

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

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

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

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

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

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

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

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