

from linearalgebra import det
from trigonometry import atan2

$$\mathbf{a} = \mathbf{v}_i - \mathbf{p}$$

$$\mathbf{b} = \mathbf{v}_j - \mathbf{p}$$

$$\mathbf{c} = \mathbf{v}_k - \mathbf{p}$$

$$a = \|\mathbf{a}\|_2$$

$$b = \|\mathbf{b}\|_2$$

$$c = \|\mathbf{c}\|_2$$

$$\frac{\text{atan2}\left(\det\left(\begin{bmatrix} \mathbf{a} & \mathbf{b} & \mathbf{c} \end{bmatrix}\right), (abc + (\mathbf{a} \cdot \mathbf{b})c + (\mathbf{b} \cdot \mathbf{c})a + (\mathbf{c} \cdot \mathbf{a})b)\right)}{2\pi}$$

where

- $\mathbf{v}_i \in \mathbb{R}^3$
- $\mathbf{v}_j \in \mathbb{R}^3$
- $\mathbf{v}_k \in \mathbb{R}^3$
- $\mathbf{p} \in \mathbb{R}^3$