Polygon Intersection Algorithm - QGC Approach

Ariel Guerrero

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Algorithm

Algorithm 1 Intersect Lines with Polygon: `intersectLinesWithPolygon`($\mathcal{L}$, $\mathcal{P}$)

Input: Lines $\mathcal{L}$, polygon $\mathcal{P}$
Output: Transects $\mathcal{T}$

$\mathcal{T} \leftarrow \emptyset$
for each $\mathbf{l} \in \mathcal{L}$ **do**
    $\mathbf{l}_{int} \leftarrow$ `intersectLinePolygon`$(\mathbf{l}, \mathcal{P})$
    if $\mathbf{l}_{int} \neq \emptyset$ **then**
        $\mathcal{T} \leftarrow \mathcal{T} \cup \{\mathbf{l}_{int}\}$
    end if
end for

return $\mathcal{T}$

Algorithm 2 Intersect Line with Polygon: `intersectLinePolygon`($\mathbf{l}$, $\mathcal{P}$)

Input: Line $\mathbf{l}$, polygon $\mathcal{P}$
Output: Intersected line $\mathbf{l}_{int}$

$\mathbf{l}_{int} \leftarrow \emptyset$
for each edge $\mathbf{p}_i, \mathbf{p}_{i+1} \in \mathcal{P}$ **do**
    $[\mathbf{x}_i, \mathbf{y}_i] \leftarrow$ `polyxpoly`$([\mathbf{l}_{1x}, \mathbf{l}_{2x}], [\mathbf{l}_{1y}, \mathbf{l}_{2y}], [\mathbf{p}_{ix}, \mathbf{p}_{i+1x}], [\mathbf{p}_{iy}, \mathbf{p}_{i+1y}])$
    if $(\mathbf{x}_i \neq \emptyset) \wedge (\mathbf{y}_i \neq \emptyset)$ **then**
        $\mathbf{l}_{int} \leftarrow \mathbf{l}_{int} \cup [\mathbf{x}_i, \mathbf{y}_i]$
    end if
end for

return $\mathbf{l}_{int}$