大纲

Sunday, December 5, 2021 9:39 AM

1. read the data from the Excel. create Point and Stratum
2. Generate TIN
3. Customize TIN, and make up customized triangle net
4. Generate the 3-D Triangle surface using the method built in matplotlib., layer by layer

结构

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Original

Stratum : list → index 0 = z coords

Point {(x, y) : list} dictionary

PointSequence [(x, y)] list

Edges [(a, b)] list

Triangles {(a, b, c) : T_1 , T_2 , T_3} dictionary

Edge to MidPoint {(a,b) : (x, y)} dictionary

Extended

MidPoint {(x, y) : list} dictionary

generate list

Extended sequence [Point + PointSequence] list

based on

Quater Triangles [(a_1 , b_1 , c_1)] list

(a, b, c) : (a, b), (b, c), (a, c)

Edge to MidPoint : (x, y) → Extended Sequence → index

Quater Triangles [(a, b, c)]

All the data above contain the four corner points which was made but not true data

细节

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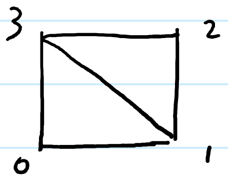
一. Point : { (x, y) : list }



0 [(T, B, flag) ← for distinguish the earth and rock
1 [None for not exists
2 [0 for boundary
3 [(T, B, flag)
4 [
5 [

change the structure : (stratum , Top, Bottom) and also create a new data : stratum

二 add Point Method → generate

- PointSequence [0 , 1, 2, 3 , (x_1, y_1), ...]
- Edges [(a,b), (b,c), ...]
- Triangles { (a, b, c) : [T_1 , T_2 , T_3] }

三. Generate Quater Triangles Method (Build in addPoint Method)

3.1 EdgeToMidPoint { (a,b) : (x, y) }

Method

```
For i in Edges :
    Edge To Mid Point [i] = Pointsequence[i[0]] + Point~ [i[1]]
```

3.2 MidPoint { (x,y) : list } constructed be like Point { (x,y) : list }

Method

(a,b) : (x, y)

↓ method ↗

list ↙ 建立映射 → (x, y) : list

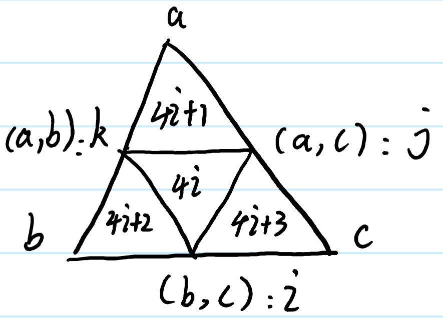
3.3 Extended Sequence = Point Sequence . add all the point in the Mid Point

Method

→ Point Sequence + Mid Point

3.4 Quater Triangles

Method Triangles { (a,b,c) : T_1 , T_2 , T_3 }



QT [4i] : (i , j , k)
[4i+1] : (a , k , j)
[4i+2] : (k , b , i)
[4i+3] : (j , i , c)

(b, c) →
(a, c) ↗ EdgeToMidPoint → (x, y)
(a, b) ↗

(x, y) ↓ Extended Sequence index

i, j, k

2.5 Listed Quater Triangles

0 : T_1 , T_2 , T_3 , ...

1 : T_i , T_j , ...

:

细节2

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① Filt out the Triangles which contains the "unnessary" Point

Target Triangles Net = Quater Triangles − Listed Quater Triangles [i]

give the z coords to each Target Tr gles Net.

that Method is designed for earth (flag 0)

stratums up to down

- 0 ("earth or rock", flag)
- 1
- 2
- ...

flag	
0:	earth
1:	残积土
2:	全风化
3:	强风化
4:	中风化
5:	微风化

without flag

3.2 Addition

Method (EdgeToMidPoint)

$(a, b) \to$ list

$\downarrow$

$$\text{PointSequence}[a] \to (x_a, y_a) \xrightarrow{\text{Point}} \text{list } A \to \text{New list}$$

$$\text{PointSequence}[b] \to (x_b, y_b) \xrightarrow{\text{Point}} \text{list } B \nearrow$$

rebuild the structure. Point: $\{(x, y) : (T, B, \text{stratum})\}$

and create a new data named "stratum"

For layer in stratum:

create two index for A and B:

iterate all the layers in list A and list B

get all the satisfied data, then move the start point of index to the statisfied layer.

situation ①: A satisfied, B failed

$$C: \left(\frac{A[idx][1] + A[idx][2]}{2}, \ldots\right)$$

situation ②. Both satisfied. but structure not similar

one to many

$$\begin{tikzcd}
 & B_x[0] \arrow[r] & j(x,y) \\
A[0] \arrow[ur] \arrow[r] \arrow[dr] & B_y[0] \arrow[r] & j(y,z) \\
 & B_z[0] &
\end{tikzcd}$$

} in generation C, but values equal to 0

Top: $(A[1] + B_x[1])/2$ Bottom. $(A[2] + B[2])/2$

then create the same amount of the point in (Top, Bottom) to match the layers in (x,y). (y,z)

细节3

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situation ③ : Both satisifed , and data looks similar

$c = A + B$

Situation ④. Both failed do nothing

jump into next layer of stratum.