Voronoi Diagrams & Delaunay Triangulation

November 1, 2019

1 Homework 9 - Q4

1.1 Problem statement:

> Look up what is either (a) a voronoi construction or (b) Delauney triangulation using octave from the internet. Illustrate the same using an example code and output.

We're going to do both of them

1.1.1 Voronoi Diagram:

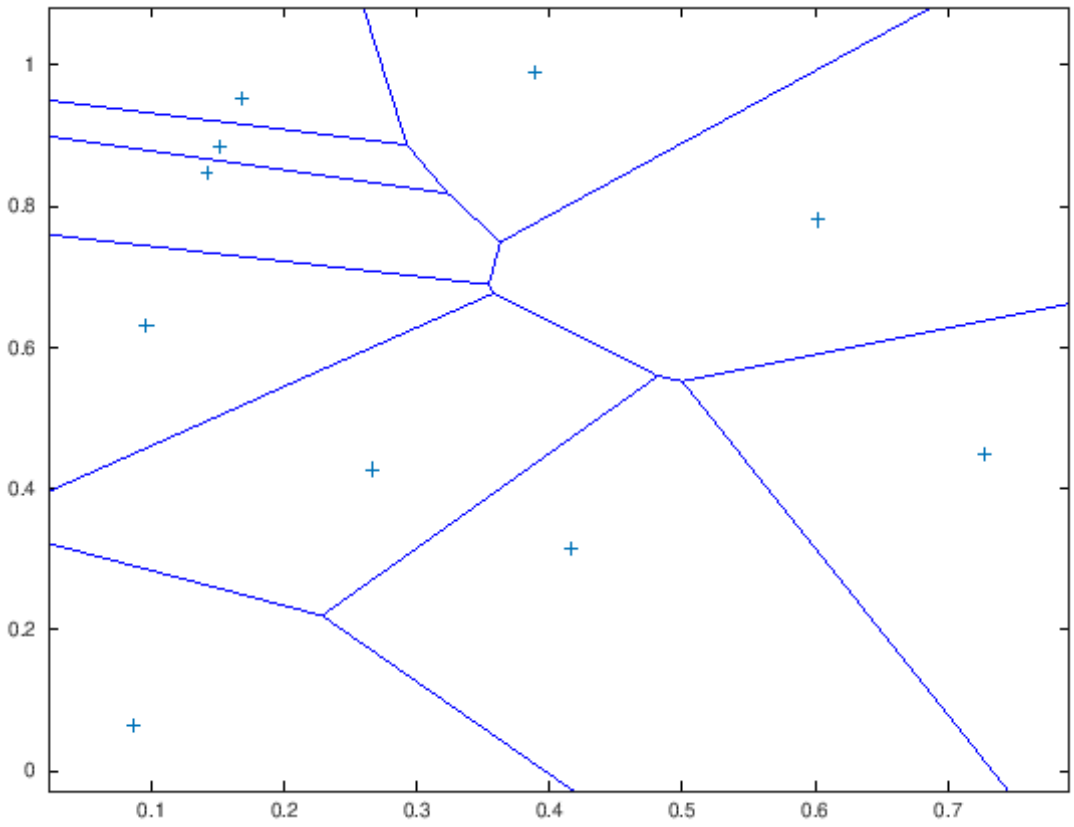
Now, the first one: A voronoi is basically the set of lines that are equidistant from any 2 points in a space filled with points. So, for this we're going to need a set of points, which we will do using the `rand` command in Octave.

[1]:
```
x = rand(1,10);
```

[2]:
```
y = rand(1,10);
```

It looks like this:

[3]:
```
v = voronoi(x,y);
```



1.1.2 Delaunay Triangulation:

This is a kind of complement to the Voronoi Diagram, hence I couldn't help but put it along with this :)

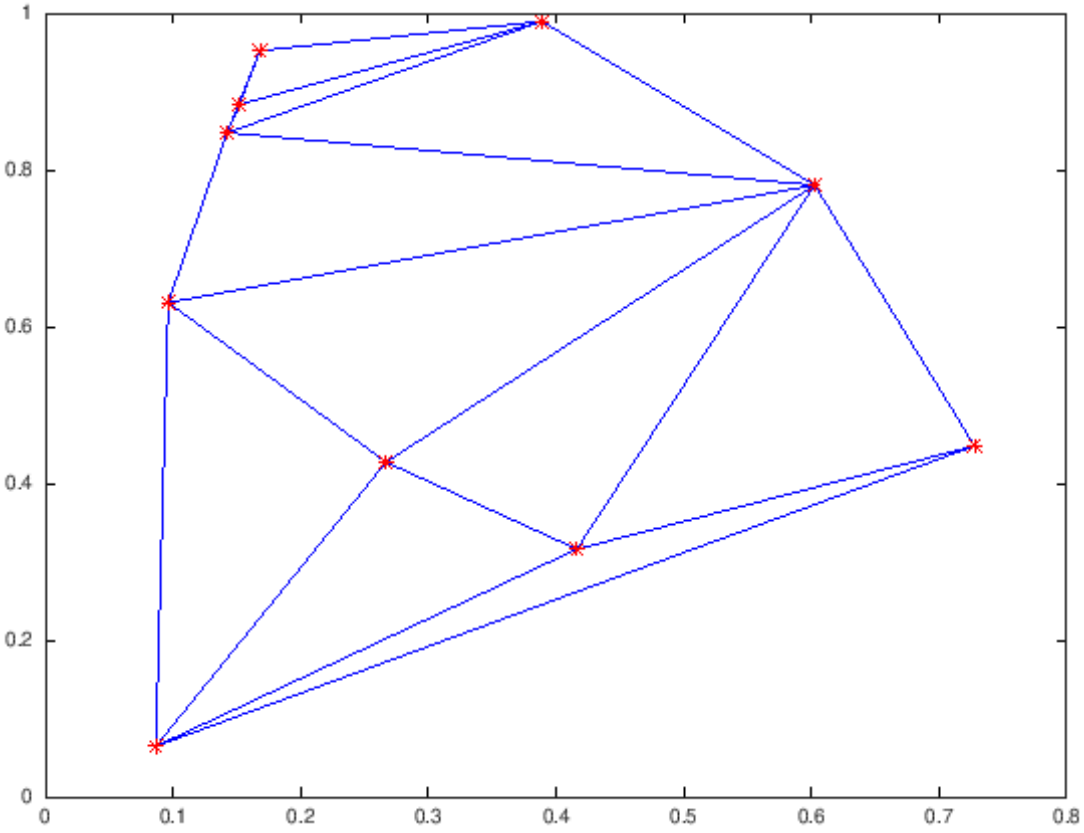
Now, Delaunay Triangulation is the set of triangles for a given set of points such that no point is inside the circumcircle of any of the triangles.

It turns out that the circumcenters of the said triangles are the vertices of the Voronoi Diagram!

More on this: Voronoi Diagram and Delaunay Triangulation

[4]:
```
T = delaunay(x,y);
```

[5]:
```
X = [ x(T(:,1)); x(T(:,2)); x(T(:,3)); x(T(:,1)) ];
Y = [ y(T(:,1)); y(T(:,2)); y(T(:,3)); y(T(:,1)) ];
p1 = plot(X,Y,"b",x,y,"r*");
```


1
0.8
0.6
0.4
0.2
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8