

# Point2D

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## 1 介绍

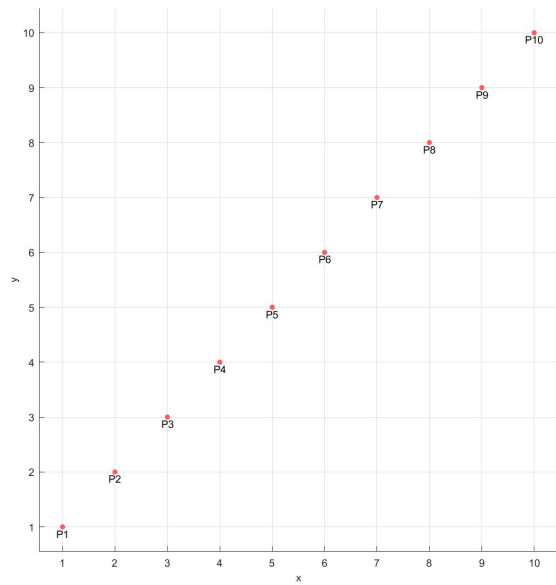
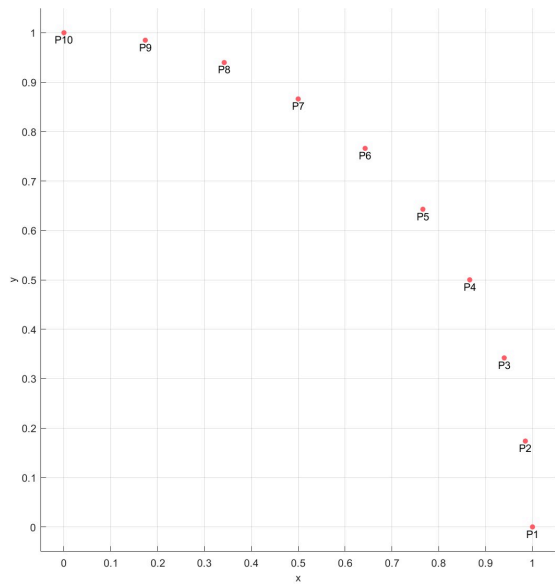
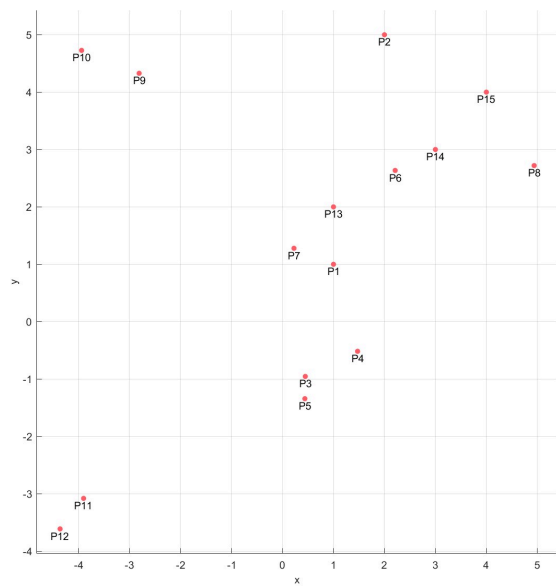
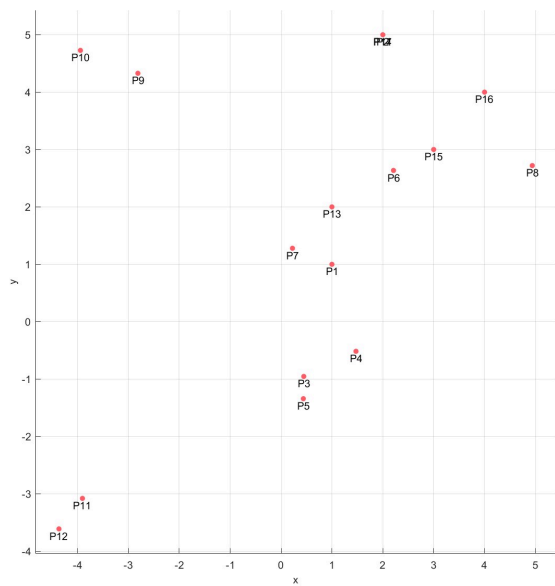
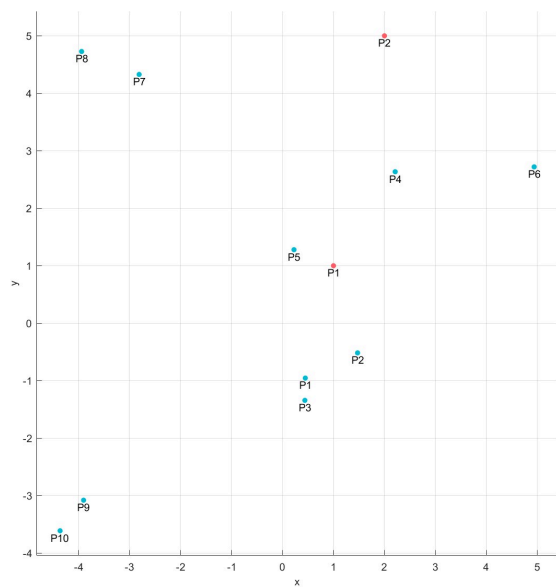
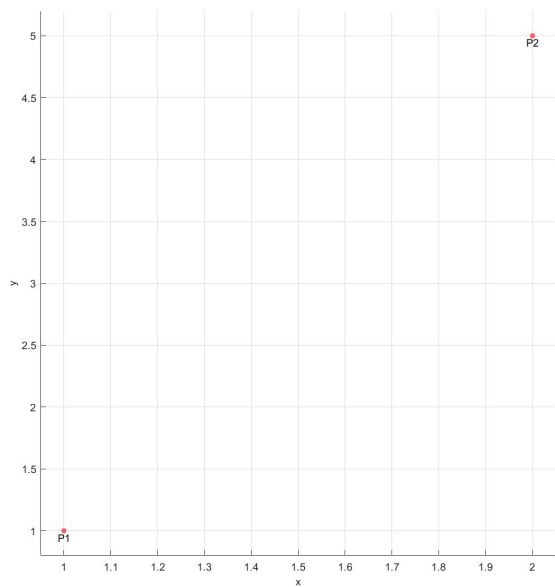
Point2D类是用来生成2D的点。

## 2 案例

### 2.1 AddPoint (Flag=1)

AddPoint为添加点。

```
1  x=[1;2];
2  y=[1;5];
3  a=Point2D('Point Ass1');
4  a=AddPoint(a,x,y);
5  Plot(a,'grid',1,'plabel',1);
6  x1=-5 + (5+5)*rand(10,1);
7  y1=-5 + (5+5)*rand(10,1);
8  a=AddPoint(a,x1,y1);
9  Plot(a,'grid',1,'plabel',1,'group',[1;2]);
10 x2=[1;2;3;4;2];
11 y2=[2;5;3;4;5];
12 a=AddPoint(a,x2,y2);
13 Plot(a,'grid',1,'plabel',1);
14 a=CompressNpts(a,'all',1);
15 Plot(a,'grid',1,'plabel',1);
16 x1=ones(10,1);
17 y1=[0;10;20;30;40;50;60;70;80;90];
18 a1=Point2D('Point Ass2');
19 % 按角度增加点
20 a1=AddPoint(a1,x1,y1,'polar','deg');
21 Plot(a1,'grid',1,'plabel',1);
22 x2=ones(10,1);
23 y2=ones(10,1);
24 a2=Point2D('Point Ass3');
25 % 以增量的方式增加点
26 a2=AddPoint(a2,x2,y2,'delta',1);
27 Plot(a2,'grid',1,'plabel',1);
```



## 2.2 Calculate the distance (Flag=2)

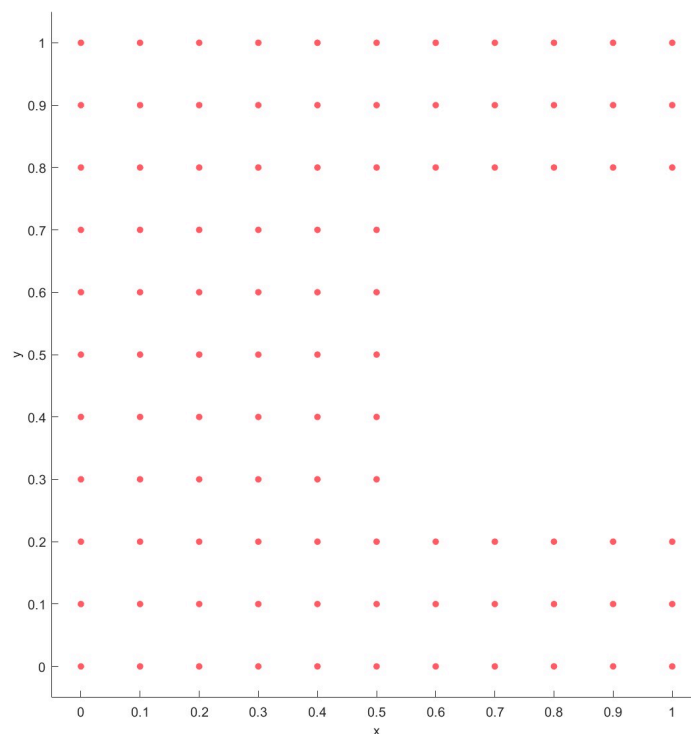
Dist用来计算输入的坐标与点之间的距离。

```
1 a=Point2D('Point Ass1');
2 x1=-5 + (5+5)*rand(10,1);
3 y1=-5 + (5+5)*rand(10,1);
4 x2=-5 + (5+5)*rand(10,1);
5 y2=-5 + (5+5)*rand(10,1);
6 a=AddPoint(a,x1,y1);
7 a=AddPoint(a,x2,y2);
8 dist=Dist(2,1,a,'group',1);
9 disp(dist)
```

## 2.3 Delete Points (Flag=3)

DelePoint可以删除对应编号或者对应规则下的坐标点。

```
1 [X,Y]=meshgrid(0:0.1:1);
2 points1=[X(:),Y(:)];
3 a=Point2D('Point Ass1');
4 a=AddPoint(a, points1(:,1), points1(:,2));
5 Plot(a);
6 f=@(x,y)(x>0.5 &y>0.2 & y<0.8);
7 a=DeletePoint(a,1,'fun',f);
8 Plot(a);
```



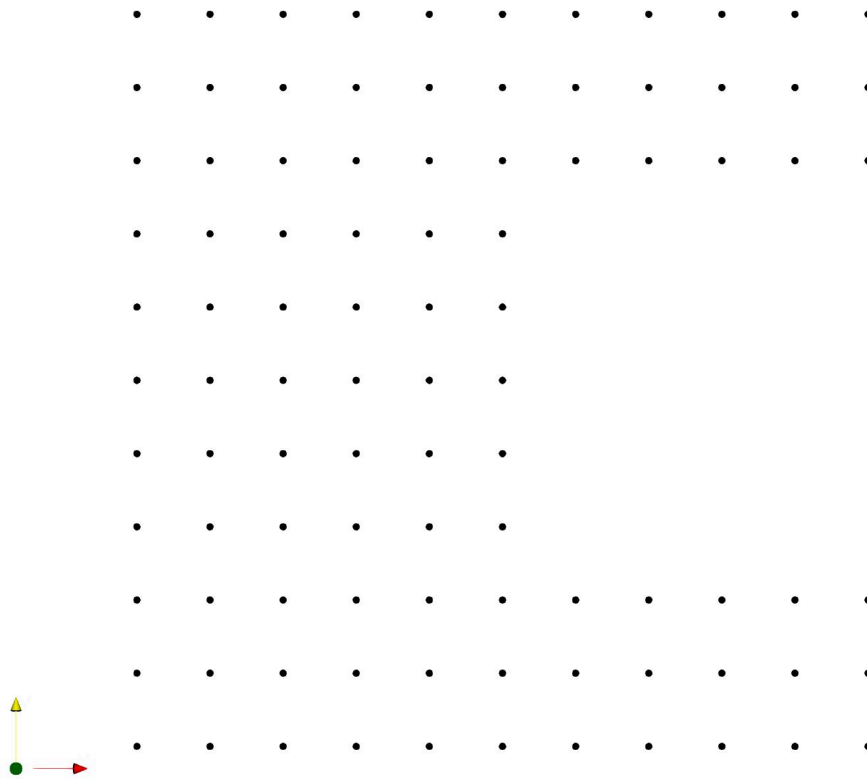
## 2.4 Plot Point2D in paraview (Flag=4)

Plot2函数将类导出为VTK格式，并调用Paraview显示

```

1 [X,Y]=meshgrid(0:0.1:1);
2 points1=[X(:),Y(:)];
3 a=Point2D('Point Ass1');
4 a=AddPoint(a, points1(:,1), points1(:,2));
5 f=@(x,y)(x>0.5 & y>0.2 & y<0.8);
6 a>DeletePoint(a,1,'fun',f);
7 Plot(a);
8 Plot2(a);

```



## 2.5 Add PointData (Flag=5)

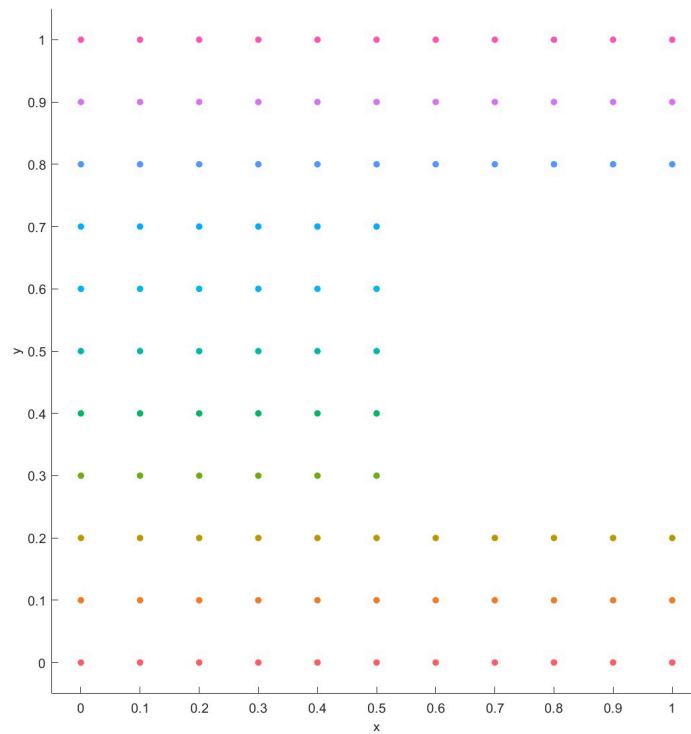
Add PointData给每个点赋值，对于一个坐标点，他有三个属性：

- 点的位置 AddPoint，人为输入；
- 点的值 AddPointData，通常是后处理计算的结果，比如位移、应力、应变等；
- 点的向量 AddPointVector，通常为后处理的结果，代表位移、应力、应变的方向。

```

1 [X,Y]=meshgrid(0:0.1:1);
2 points1=[X(:),Y(:)];
3 a=Point2D('Point Ass1');
4 a=AddPoint(a, points1(:,1), points1(:,2));
5 f=@(x,y)(x>0.5 & y>0.2 & y<0.8);
6 a>DeletePoint(a,1,'fun',f);
7 a=AddPointData(a,a.P(:,2));
8 Plot(a);

```

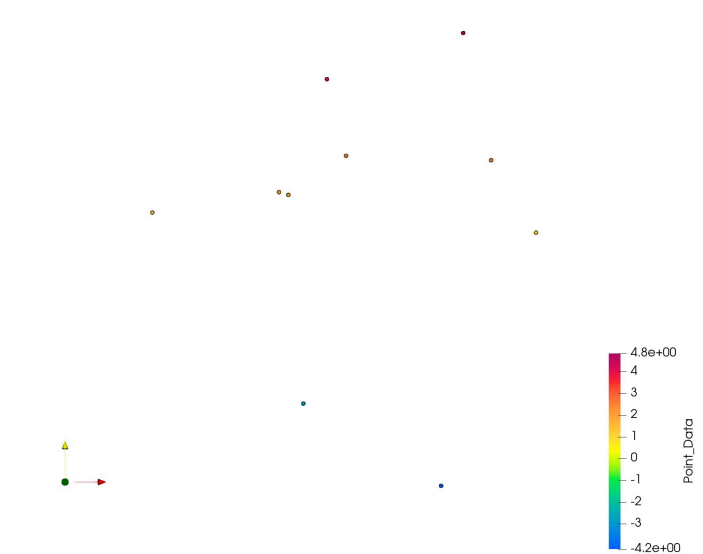
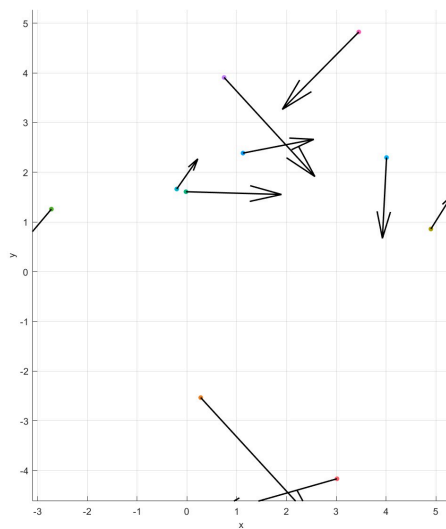


## 2.6 Add PointVector (Flag=6)

```

1 a=Point2D('Point Ass1');
2 x1=-5 + (5+5)*rand(10,1);
3 y1=-5 + (5+5)*rand(10,1);
4 u=-1 + 2*rand(10,1);
5 v=-1 + 2*rand(10,1);
6 a=AddPoint(a,x1,y1);
7 a=AddPointVector(a,[u,v]);
8 a=AddPointData(a,a.P(:,2));
9 Plot(a,'Vector',1,'grid',1,'equal',1)
10 Plot2(a)

```



### 3 CheatTable

Name	Varargin	Description
AddPoint(obj,x,y)	'polar','delta'	Add points
AddPointData(obj,Data)		Add point data
AddPointVector(obj,Vec)		Add point vector
CompressNpts(obj)	'all'	Compress point number
DeletePoint(obj)	'fun'	Delete point
Dist(x,y,obj)	'group'	Calculate distance
GetNgpts(obj)		Get total number of point group
GetNpts(obj)		Get total number of points
GetPoint(obj,id,t)		Get point coordinate
Help(obj)		Open help file
Plot(obj)	'Plabel','Grid','Group','Equal', 'Vector','VectorScale',	Plot Point2D object
Plot2(obj)		Plot Point2D object in Paraview
VTKWrite(obj)	'Echo'	Write VTK file of Point2D

### 4 Reference