> 数值计算第四章作业——20195633李燕琴

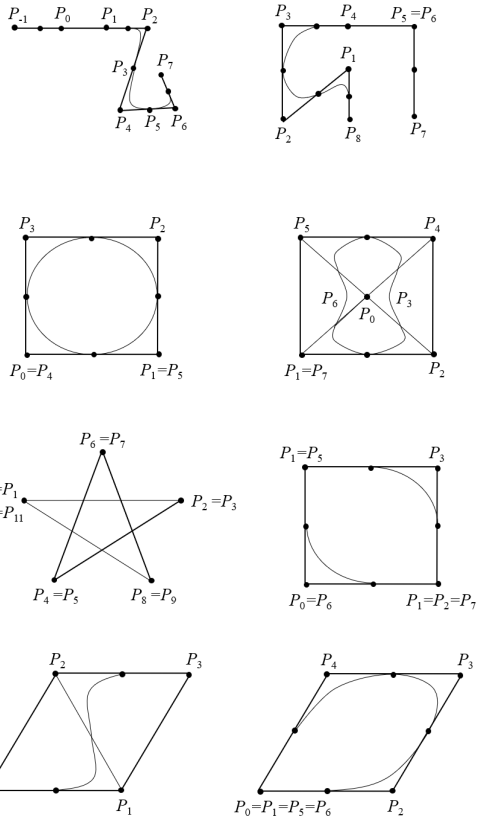
题目概览：

作业：

P48. 2、4任选一题

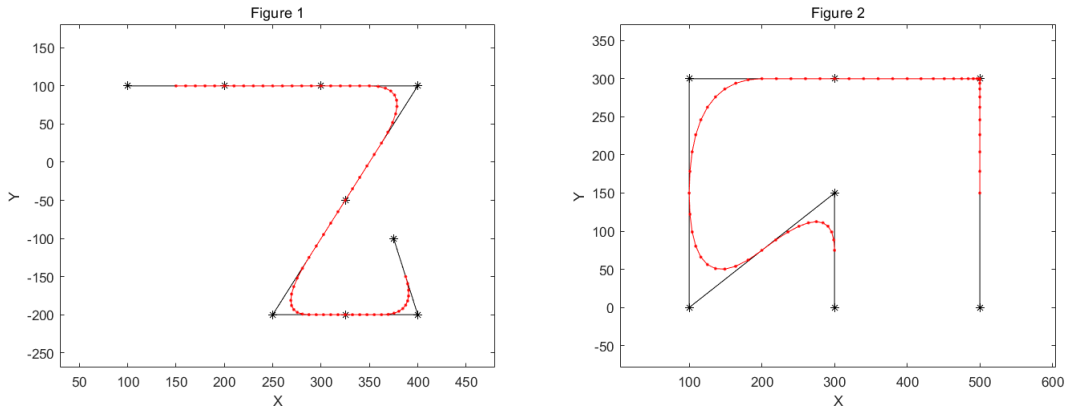
1. 设计B样条曲线的流程图。（P48，第2题）

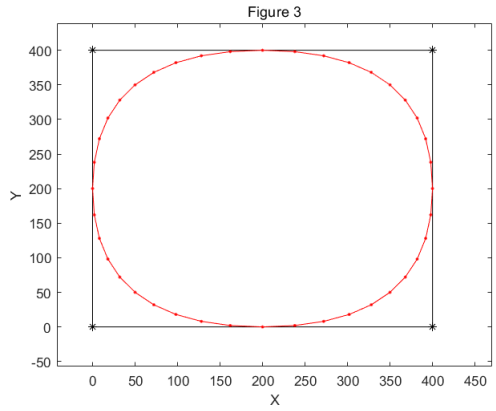
2. 编程实现下面的二次B样条曲线（P48，第4题）

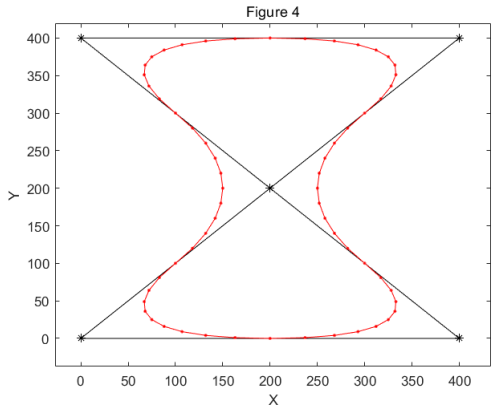


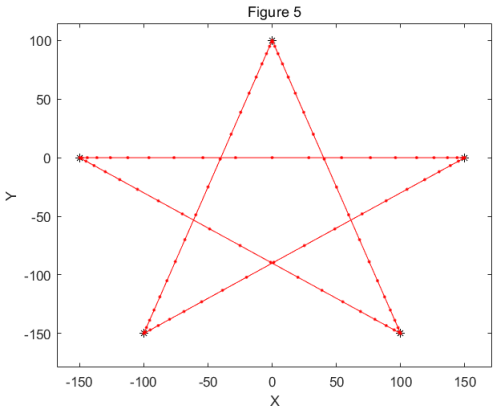
P48，第4题：编程实现二次B样条曲线

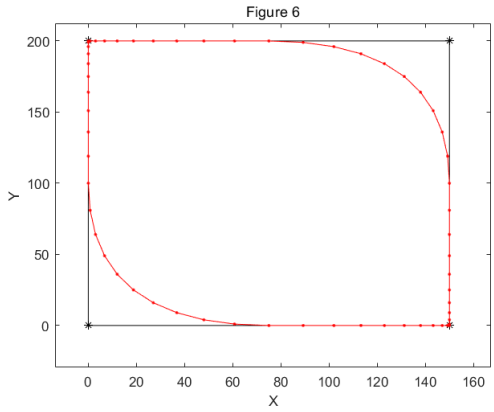
结果：

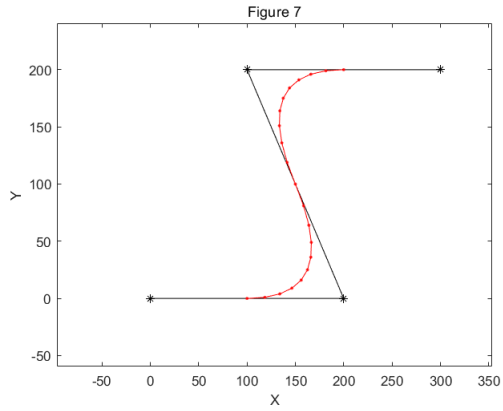


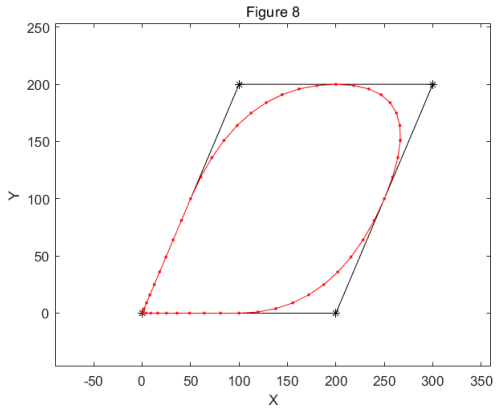












`Matlab`代码

```matlab
% 初始点
figure(1)
% 初始点
p = [100,100; 200,100; 300,100; 400,100; ...
    325,-50; 250,-200; 325,-200; 400,-200; 375,-100];
Bcurve_print(p);
title("Figure 1");
xlabel("X");
ylabel("Y");

figure(2)
p = [300,0; 300,150; 100,0; 100,300; ...
    300,300; 500,300; 500,300; 500,0];
Bcurve_print(p);
title("Figure 2");
xlabel("X");
ylabel("Y");

```

```
figure(3)
p = [0,0; 400,0; 400,400; 0,400; 0,0; 400,0];
Bcurve_print(p);
title("Figure 3");
xlabel("X");
ylabel("Y");

figure(4)
p = [200,200;0,0; 400,0; 200,200; 400,400; ...
    0,400; 200,200; 0,0;];
Bcurve_print(p);
title("Figure 4");
xlabel("X");
ylabel("Y");

figure(5)
p = [-150,0;-150,0; 150,0;150,0;-100,-150;-100,-150; ...
    0,100; 0,100; 100,-150; 100,-150;-150,0;-150,0;];
Bcurve_print(p);
title("Figure 5");
xlabel("X");
ylabel("Y");

figure(6)
p = [0,0; 150,0; 150,0; 150,200; 0,200; 0,200; 0,0; 150,0];
Bcurve_print(p);
title("Figure 6");
xlabel("X");
ylabel("Y");

figure(7)
p = [0,0; 200,0; 100,200; 300,200];
Bcurve_print(p);
title("Figure 7");
xlabel("X");
ylabel("Y");

figure(8)
p = [0,0; 0,0; 200,0; 300,200; 100,200; 0,0; 0,0;];
Bcurve_print(p);
title("Figure 8");
xlabel("X");
ylabel("Y");

function Bcurve_print(p)
%BCURVE_PRINT B样条曲线绘制
%   Bcurve_print(p,n) p为型值点size(p)=[n,2]，n为型值点个数
n = size(p,1);
% 绘制控制多边形
plot(p(:,1),p(:,2),"k*-");
hold on
% 循环3点插值
for i=1:n-2
    % 公式初始点
    z1 = (p(i,:)-2*p(i+1,:)+p(i+2,:))/2;
    z2 = -p(i,:)+p(i+1,:);
    z3 = (p(i,:)+p(i+1,:))/2;
    m = 10;
```

```
    xy = zeros(m+1,2); % 插值点
    xy(1,:) = z3;
    for j=1:m
        u = j/m;
        xy(j+1,:) = u^2.*z1 + u.*z2 + z3;
    end
    plot(xy(:,1),xy(:,2),"r.-");
end
hold off
end
```