邊界元素法

Homework 12

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Matlab 程式碼解內域問題

```
                    ------------------------In------------------------
clear all,clc
j=1;
for p=0:0.5:5
      i=1;
      for phi=0:pi/200:2*pi
            a=0;
            for m=1:200;
                  u=(1/m)*((p/5)^m)*cos(m*((pi/4)-phi));
                  a=a+u;
                  x=p*cos(phi);
                  y=p*sin(phi);
            end
            U=log(5)-a;
            X(j,i)=x;
            Y(j,i)=y;
            Z(j,i)=U;
            i=i+1;
      end
      j=j+1;
end
[C,h]=contour3(X,Y,Z,linspace(-5,5))
axis equal
```

程式執行結果如 *Figure 1.* 所示

Matlab 程式碼解外域問題

```
                    ----------Out----------
clear all,clc
j=1;
for p=5:0.5:10
      i=1;
      for phi=0:pi/200:2*pi
            a=0;
            for m=1:200;
                  u=(1/m)*((5/p)^m)*cos(m*((pi/4)-phi));
                  a=a+u;
                  x=p*cos(phi);
                  y=p*sin(phi);
            end
            U=log(p)-a;
            X(j,i)=x;
            Y(j,i)=y;
            Z(j,i)=U;
            i=i+1;
      end
      j=j+1;

end
[C,h]=contour3(X,Y,Z,linspace(-5,5))
axis equal
```

程式執行結果如 *Figure 2.* 所示

Matlab 程式碼解 $\ln r$

```
clc;
clear;
[x,y]=meshgrid(-10:0.1:10);
z=log(sqrt(abs((x-4*cos(pi/4)).^2+(y-4*sin(pi/4)).^2)));
contour3(x,y,z,linspace(-5,5));
clabel(C,h);
grid on;
```

程式執行結果如 *Figure 3.* 所示

附圖

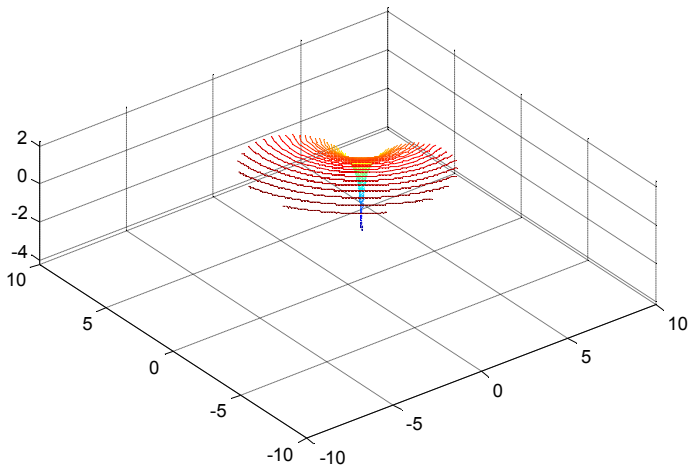


Figure 1.(內域問題)

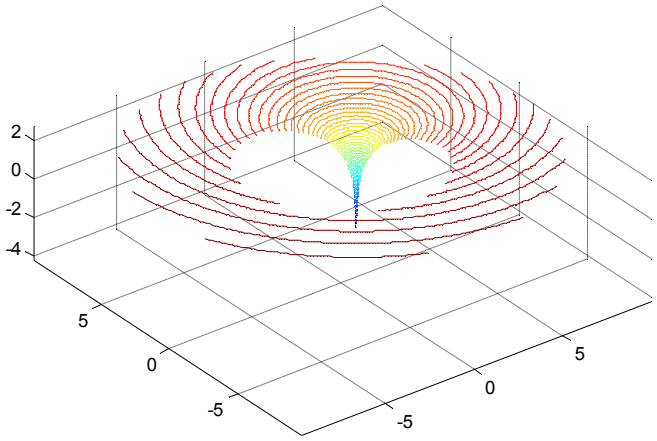
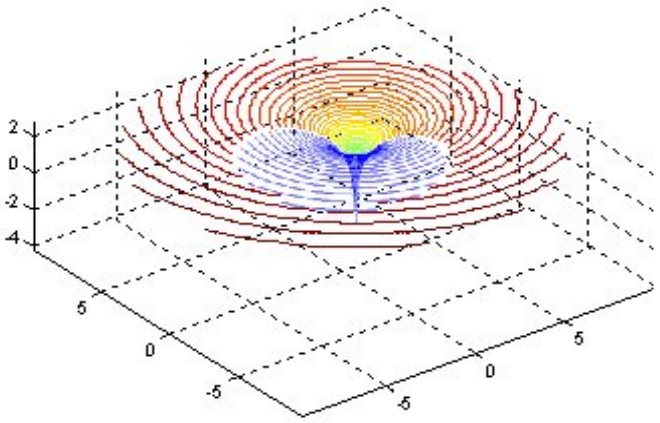


Figure 2.(外域問題)



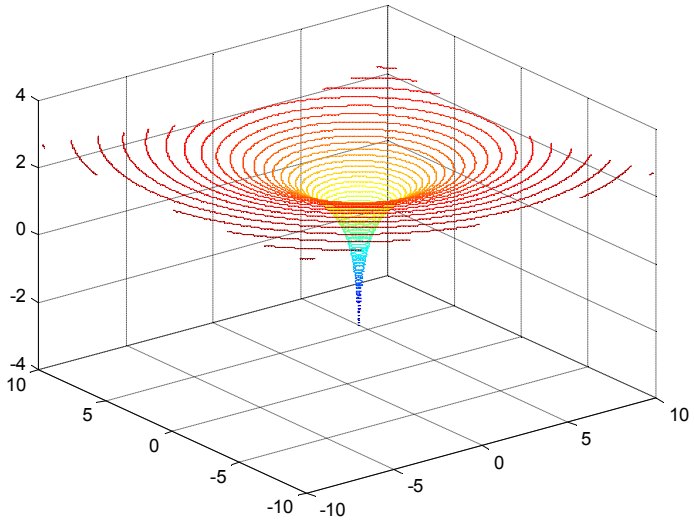


Figure 3. ($\ln r$)