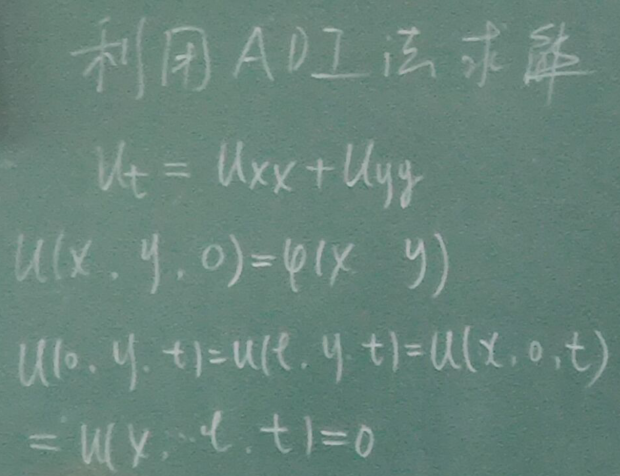
原题



代码

clear all;

clc;

two\_dimensional\_adi\_t = 1; %时间范围，计算到1秒

two\_dimensional\_adi\_x = 1;two\_dimensional\_adi\_y = 1; %空间范围，0-1米

two\_dimensional\_adi\_m = 1000; %时间t方向分1000个格子

two\_dimensional\_adi\_n = 10; %空间x方向分10个格子

two\_dimensional\_adi\_k = 10; %空间y方向分10个格子

two\_dimensional\_adi\_ht = two\_dimensional\_adi\_t/(two\_dimensional\_adi\_m-1); %时间步长dt

two\_dimensional\_adi\_hx = two\_dimensional\_adi\_x/(two\_dimensional\_adi\_n-1); %空间步长dx

two\_dimensional\_adi\_hy = two\_dimensional\_adi\_y/(two\_dimensional\_adi\_k-1); %空间步长dy

two\_dimensional\_adi\_f=[];

two\_dimensional\_adi\_N = two\_dimensional\_adi\_n;

two\_dimensional\_adi\_x = linspace(0,1,two\_dimensional\_adi\_N);%得到N个差分点

two\_dimensional\_adi\_y = linspace(0,1,two\_dimensional\_adi\_N);%得到N个差分点

for i = 1:two\_dimensional\_adi\_N

for j = 1:two\_dimensional\_adi\_N

two\_dimensional\_adi\_f(i,j) = two\_dimensional\_adi\_x(i)\*two\_dimensional\_adi\_x(j);

end

end

two\_dimensional\_adi\_u = zeros(two\_dimensional\_adi\_m,two\_dimensional\_adi\_n,two\_dimensional\_adi\_k);

[two\_dimensional\_adi\_x,two\_dimensional\_adi\_y] = meshgrid(0:two\_dimensional\_adi\_hx:1,0:two\_dimensional\_adi\_hy:1);

two\_dimensional\_adi\_u(1,:,:) = two\_dimensional\_adi\_f;

two\_dimensional\_adi\_r = two\_dimensional\_adi\_ht/(2\*two\_dimensional\_adi\_hx^2);

two\_dimensional\_adi\_dia = repmat(1+2\*two\_dimensional\_adi\_r,[1,two\_dimensional\_adi\_n-2]);

two\_dimensional\_adi\_dia1 = repmat(two\_dimensional\_adi\_r,[1,two\_dimensional\_adi\_n-3]);

two\_dimensional\_adi\_A = diag(two\_dimensional\_adi\_dia,0);

two\_dimensional\_adi\_A = two\_dimensional\_adi\_A + diag(two\_dimensional\_adi\_dia1,-1);

two\_dimensional\_adi\_A = two\_dimensional\_adi\_A + diag(two\_dimensional\_adi\_dia1,1);

for ii=1:two\_dimensional\_adi\_m-1

for kk=2:two\_dimensional\_adi\_k-1

two\_dimensional\_adi\_b=[];

for i = 1:two\_dimensional\_adi\_n-2

j=i+1;

two\_dimensional\_adi\_b(i) = two\_dimensional\_adi\_u(ii,j,kk) + two\_dimensional\_adi\_r\*(two\_dimensional\_adi\_u(ii,j,kk+1)+two\_dimensional\_adi\_u(ii,j,kk-1)-...

2\*two\_dimensional\_adi\_u(ii,j,kk));

end

two\_dimensional\_adi\_b(1) = two\_dimensional\_adi\_b(1) + two\_dimensional\_adi\_r\*two\_dimensional\_adi\_u(ii,1,kk);

two\_dimensional\_adi\_b(two\_dimensional\_adi\_n-2) = two\_dimensional\_adi\_b(two\_dimensional\_adi\_n-2) + two\_dimensional\_adi\_r\*two\_dimensional\_adi\_u(ii,two\_dimensional\_adi\_n,kk);

temp = inv(two\_dimensional\_adi\_A)\*two\_dimensional\_adi\_b';

two\_dimensional\_adi\_b2=[];

for i = 1:two\_dimensional\_adi\_n-2

j=i;

if j == 1

two\_dimensional\_adi\_b2(i) = temp(j) + two\_dimensional\_adi\_r\*(temp(j+1)+0-2\*temp(j));

elseif j==two\_dimensional\_adi\_n-2

two\_dimensional\_adi\_b2(i) = temp(j) + two\_dimensional\_adi\_r\*(temp(j-1)+0-2\*temp(j));

else

two\_dimensional\_adi\_b2(i) = temp(j) + two\_dimensional\_adi\_r\*(temp(j+1)+temp(j-1)-2\*temp(j));

end

end

two\_dimensional\_adi\_temp2 = inv(two\_dimensional\_adi\_A)\*two\_dimensional\_adi\_b2';

for i = 2:two\_dimensional\_adi\_n-1

j = i-1;

two\_dimensional\_adi\_u(ii+1,i,kk) = two\_dimensional\_adi\_temp2(j);

end

end

end

for i=1:two\_dimensional\_adi\_m

figure(1);

mesh(two\_dimensional\_adi\_x,two\_dimensional\_adi\_y,reshape(two\_dimensional\_adi\_u(i,:,:),[two\_dimensional\_adi\_n two\_dimensional\_adi\_k]));

axis([0 1 0 1 -2 2]);

end

