

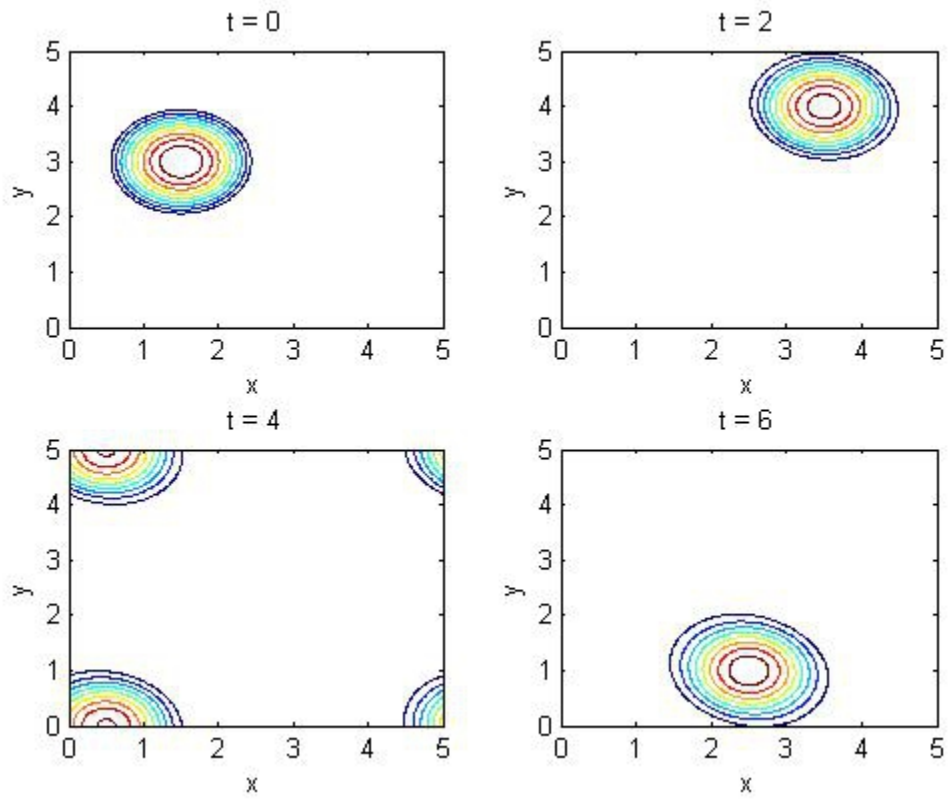
Prob 1a Example of Matlab code

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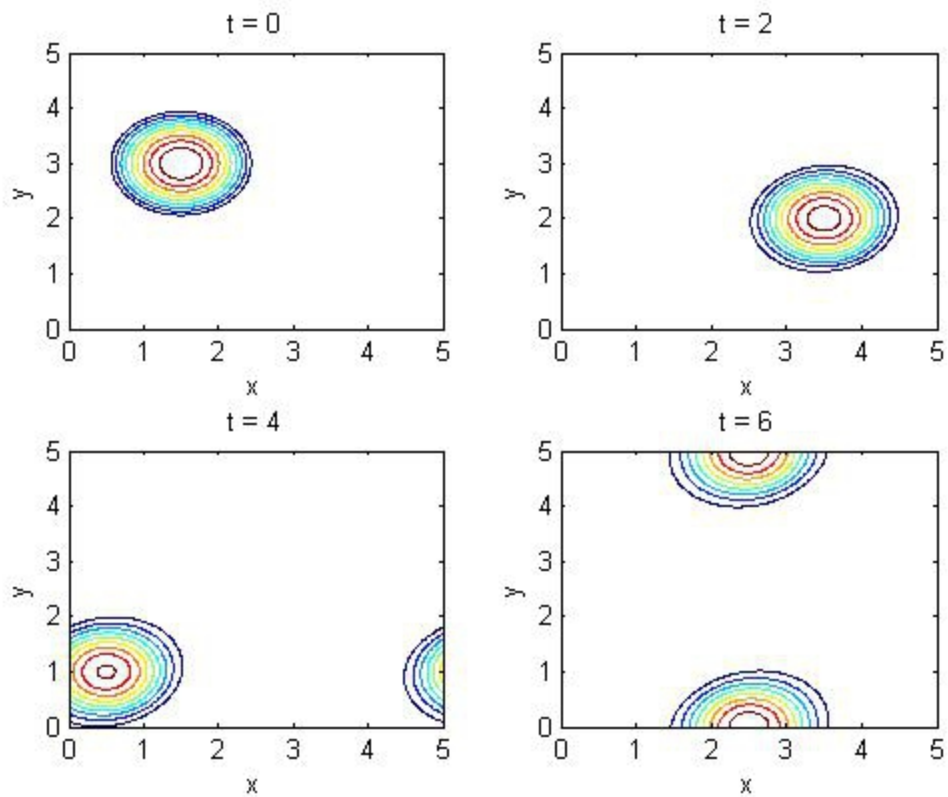
clear
C = 1; D = 0.5; dx = 0.02; dy = 0.02; dt = 0.01;
A1 = 1-(C*dt/dx)-(D*dt/dy); A2 = C*dt/dx; A3 = D*dt/dy;
NSTEP = 600; NOUT = 200;
x = [0:dx:5]; y = [0:dy:5];
N = length(x); M = length(y);
for i = 1:N
    for j = 1:M
        dd = sqrt((x(i)-1.5)^2+(y(j)-3)^2);
        if (dd <= 1)
            u2d(i,j) = cos(0.5*pi*dd);
        else
            u2d(i,j) = 0;
        end
        uplot(i,j,1) = u2d(i,j);
        x2d(i,j) = x(i); y2d(i,j) = y(j);
    end
end
%
icount = 1;
for istep = 1:NSTEP
    for i = 2:N
        for j = 2:M
            u2d_NEW(i,j) = A1*u2d(i,j)+A2*u2d(i-1,j)+A3*u2d(i,j-1);
        end
    end
    for i = 2:N
        u2d_NEW(i,1) = u2d_NEW(i,M);
    end
    for j = 1:M
        u2d_NEW(1,j) = u2d_NEW(N,j);
    end
    if (mod(istep,NOUT) == 0)
        icount = icount+1;
        for i = 1:N
            for j = 1:M
                uplot(i,j,icount) = u2d_NEW(i,j);
            end
        end
    end
    u2d = u2d_NEW;
end
S = {'t = 0', 't = 2', 't = 4', 't = 6'};
for ip = 1:4
    subplot(2,2,ip)
    contour(x2d,y2d,uplot(:, :, ip), [0.1:0.1:0.9])
    xlabel('x'); ylabel('y');
    title(S(ip))
end

```

Prob 1a plot



Prob 1b plot
(We will discuss the detail of the solution in class)



Prob 2 plot

