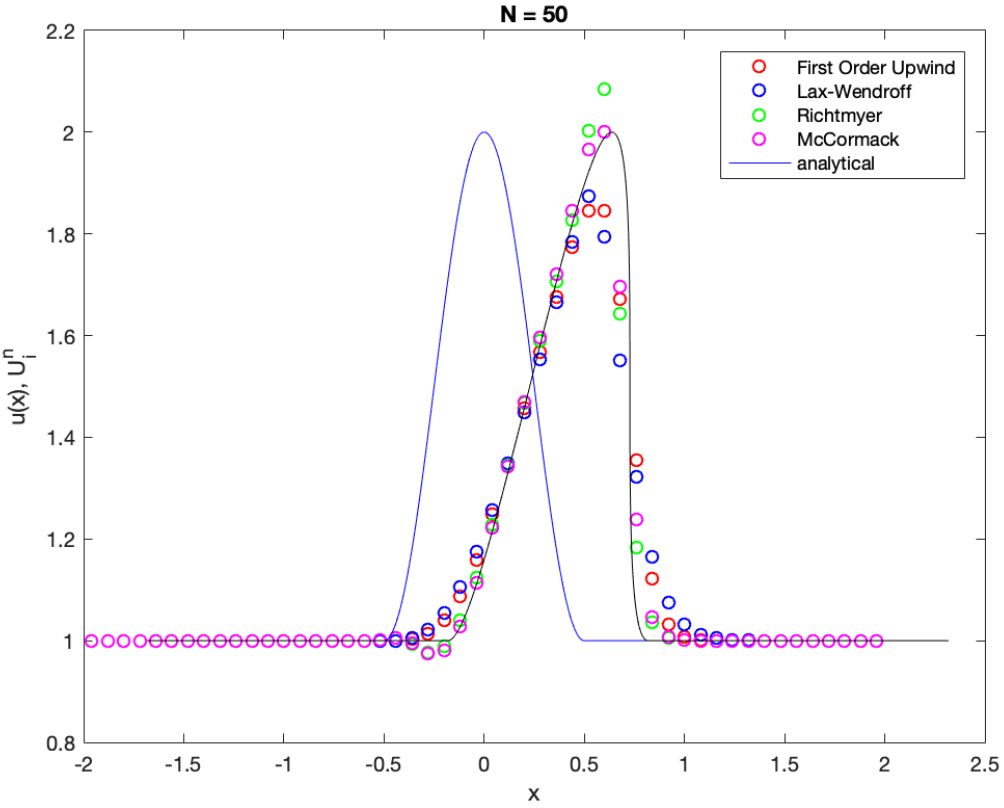
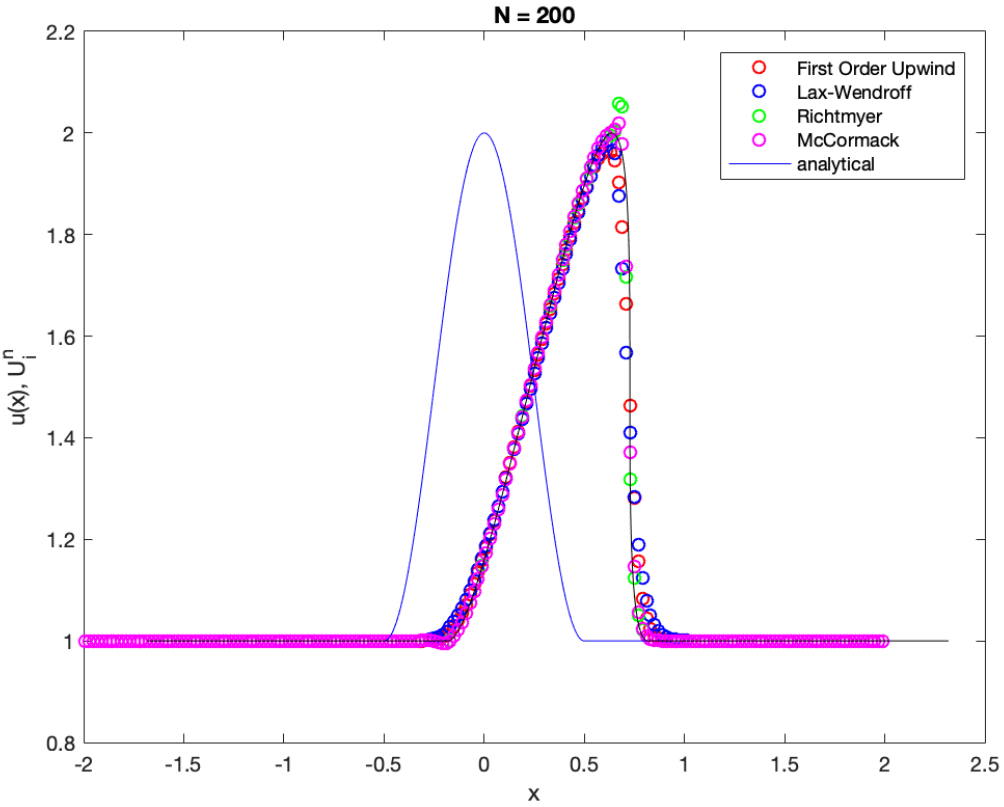
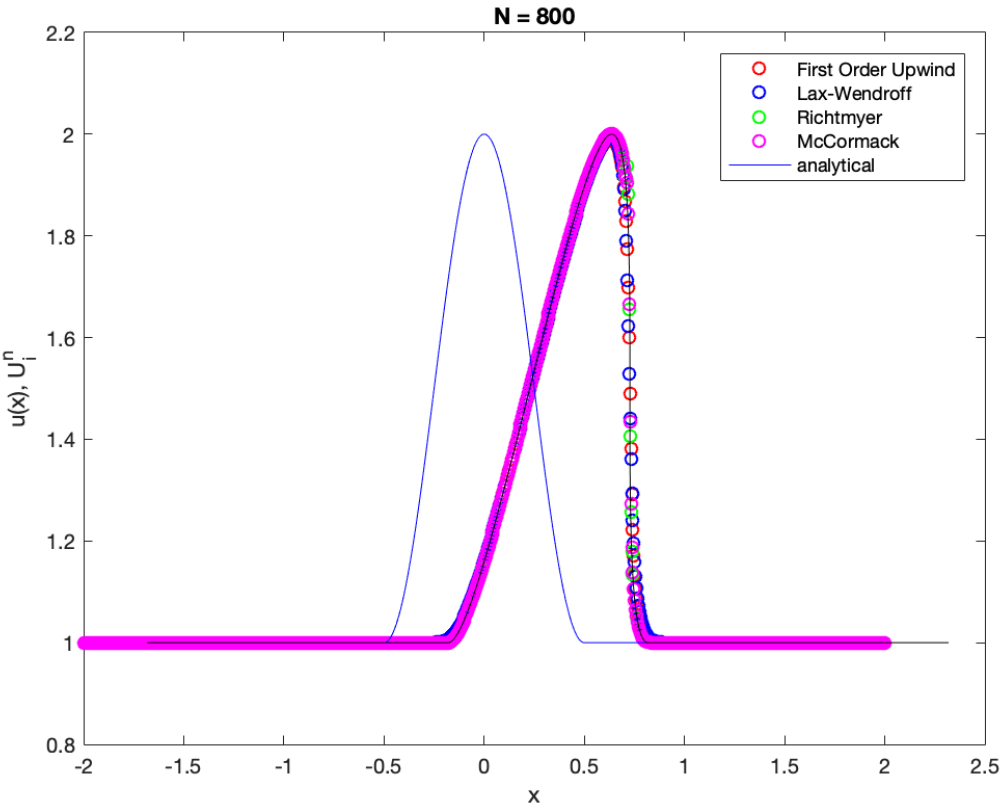
```
clear all; close all; clc
% ready to submit

%method='first-order-upwind';
%method='lax-wendroff';
%method='richtmyer';
%method='maccormack';
%uh=@step; uL=2; uR=1; L=2; N=50; T=2/3; name='step';
uh=@hump; uL=1; uR=1; L=2; N=50; T=1/pi-1e-5; name='hump';


method = {'first-order-upwind' 'lax-wendroff' 'richtmyer' 'maccormack'};
line = {'ro','bo','go','mo'};
N = [50 200 800];

fh=@burgers; % exact flux function f=f(u)



sigma=0.75;

for i = 1:3       % loop through n
    figure
    for j = 1:4   % loop through methods
        [xm,U]=advanceconservative(uh,fh,uL,uR,L,sigma,N(i),T,method{j});
        x_=linspace(-L,L,10000);
        [xi,ui]=burgersanalytical(x_,uh,T);
        plot(xm,U,line{j});
        hold on
    end

    %axis([-0.5,L,0,2.5]);
    plot(xi, feval(uh,xi),'b-')
    hold on
    plot(xi, ui, 'k-')
    hold off

    title(sprintf('N = %d',N(i)));
    xlabel('x'); ylabel('u(x), U^n_i');
    legend('First Order Upwind','Lax-Wendroff','Richtmyer','McCormack','analytical');
end
```


N = 50
First Order Upwind
Lax-Wendroff
Richtmyer
McCormack
analytical
u(x), U_i^n
x
2.2
2
1.8
1.6
1.4
1.2
1
0.8
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5


N = 200
First Order Upwind
Lax-Wendroff
Richtmyer
McCormack
analytical
u(x), U_i^n
x
2.2
2
1.8
1.6
1.4
1.2
1
0.8
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5



Published with MATLAB® R2017a