```matlab
fprintf('del(x) = 0.01, del(t) = 0.06\n');
fprintf('Velocities = 0.08 & -0.08\n');
dx = 0.01;
dt = 0.06;

x = 0-dx:dx:1+dx;
t = 0:dt:1;

v = [0.08; -0.08];

for j = 1 : length(v)
    u0 = exp(-200*(x-0.25).^2);
    u = u0;
    unp1 = u0;
    t = 0;
    N = 1/dx;
    nsteps = 1/dt;
    for n = 1 : nsteps
        u(1) = u(3);
        u(N+3) = u(N+1);

        for i = 2 : N+2
            unp1(i) = u(i) - v(j)*dt/dx*(u(i) - u(i-1));
        end
        t = t + dt;
        u = unp1;
        if round(t,4)==0.3000
            exact = exp(-200*(x-0.25 - v(j)*t).^2);
            figure(j);
            plot(x, exact, 'r-');
            xlabel('x');
            ylabel('u(x,t)');
            grid on
            hold on
            plot(x, u, 'b.-');
            hold off
            title(sprintf('time = %1.3f, velocity = %1.3f',t, v(j)))
            legend('Exact', 'Calculated')
        end
    end
end

del(x) = 0.01, del(t) = 0.06
Velocities = 0.08 & -0.08
```
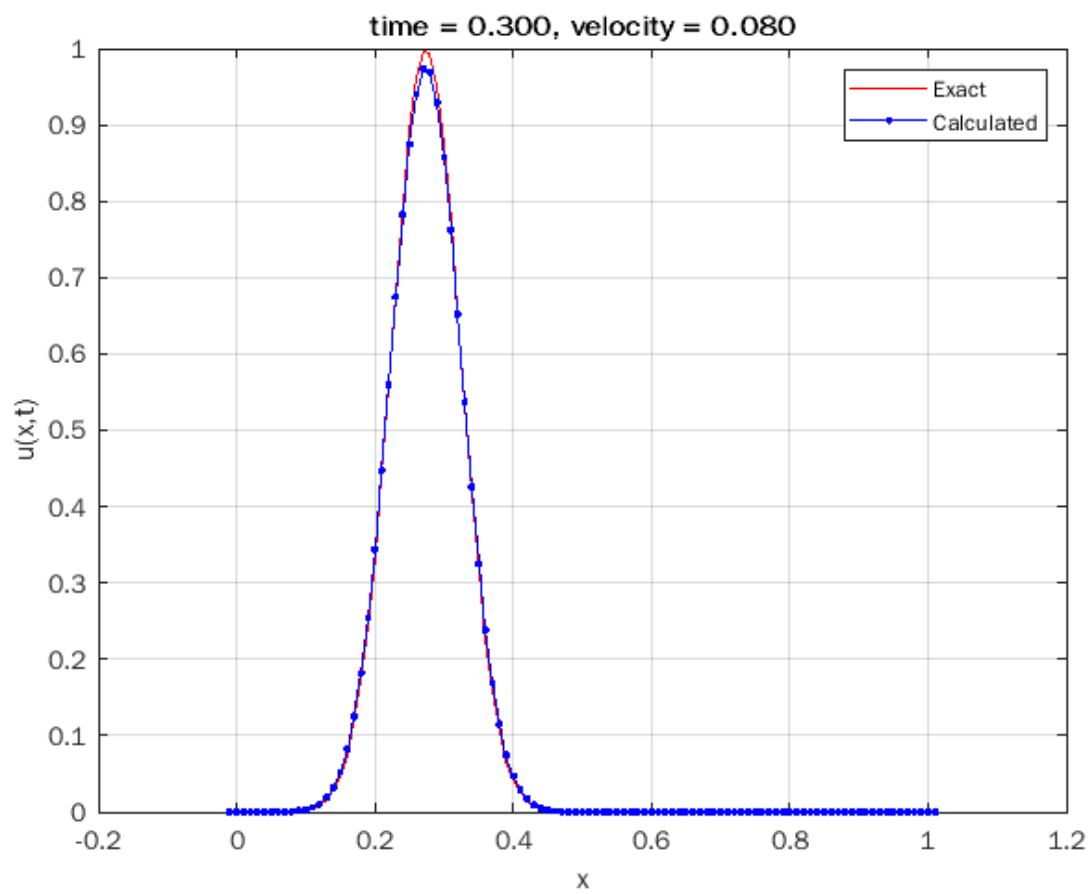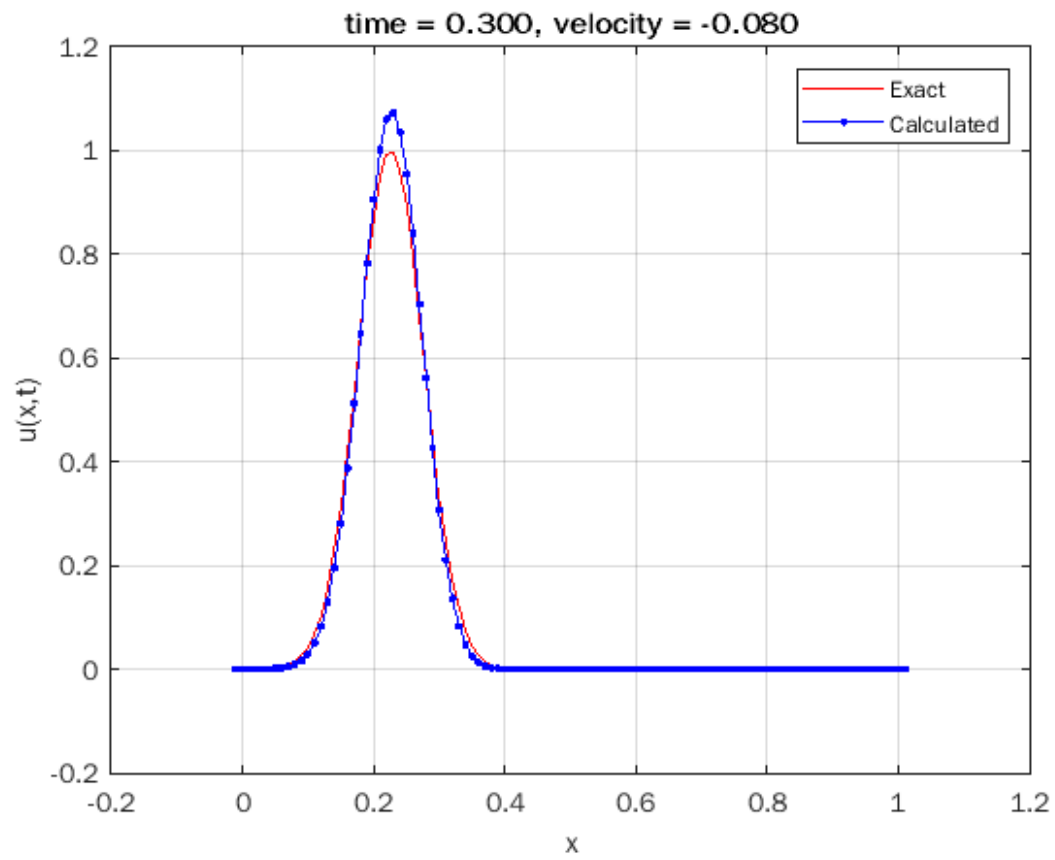
time = 0.300, velocity = 0.080

time = 0.300, velocity = -0.080

Published with MATLAB® R2022a