Ay190 – Worksheet 15

David Vartanyan

Date: March 3, 2014

1

We solve the shock tube problem using smoothed particle hydrodynamics. We apply a particle treatment but average over density and pressure gradients by means of a smoothing kernel.

We introduce an artificial viscosity term to allow for nonadiabatic interactions (which would increase entropy), but we neglect self-gravity.

The code is simple enough to fill out following the notes. It is also incredibly slow. In the plots below, the x-axis is distance and the y-axis is density.

You can see in Figures 1, 2, and 3 as we increase time material spills over shock front.

2

I did not have access to a Fortran compiler.

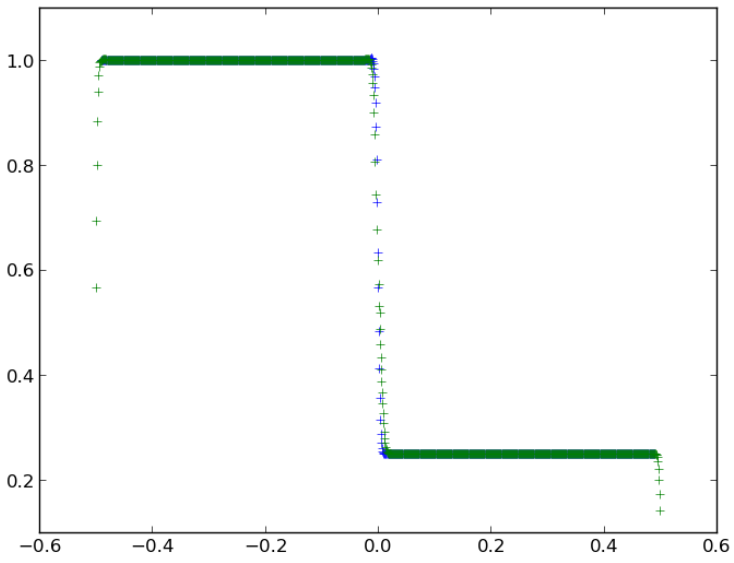

Figure 1: Shock 0.0063 seconds in

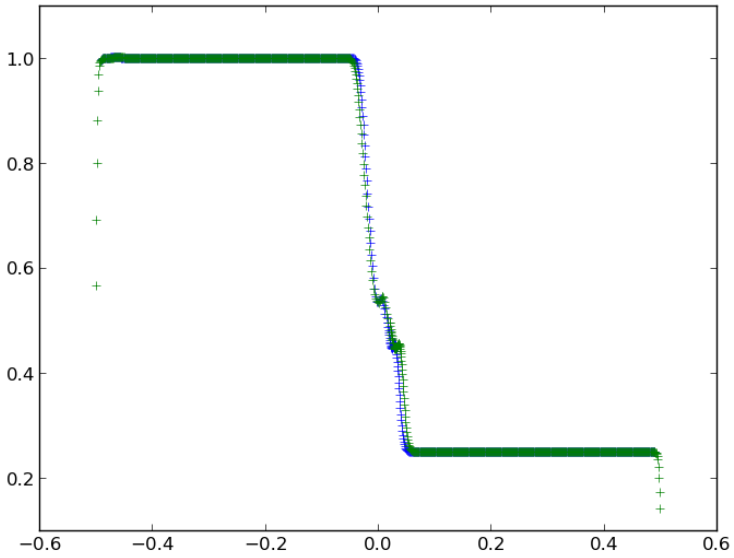

Figure 2: Shock 0.0315 seconds in

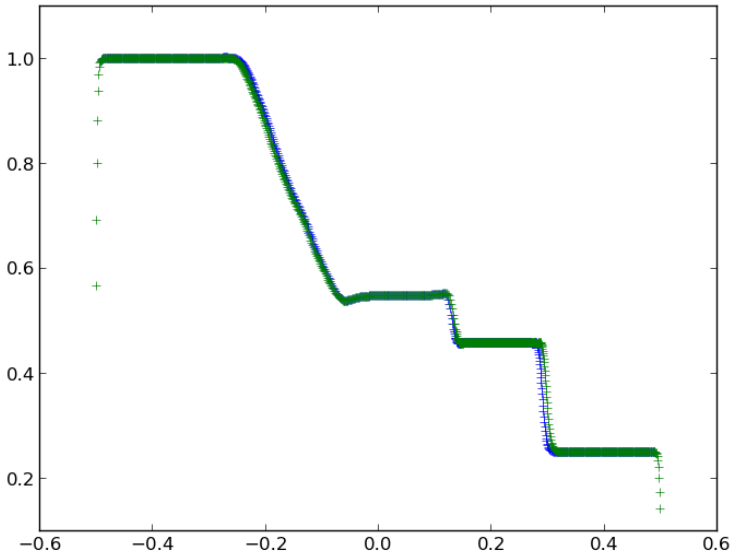

Figure 3: Shocks 0.2 seconds in