Computational Fluid Dynamics 1 - HW1

Godfred Sabbih, FZP281

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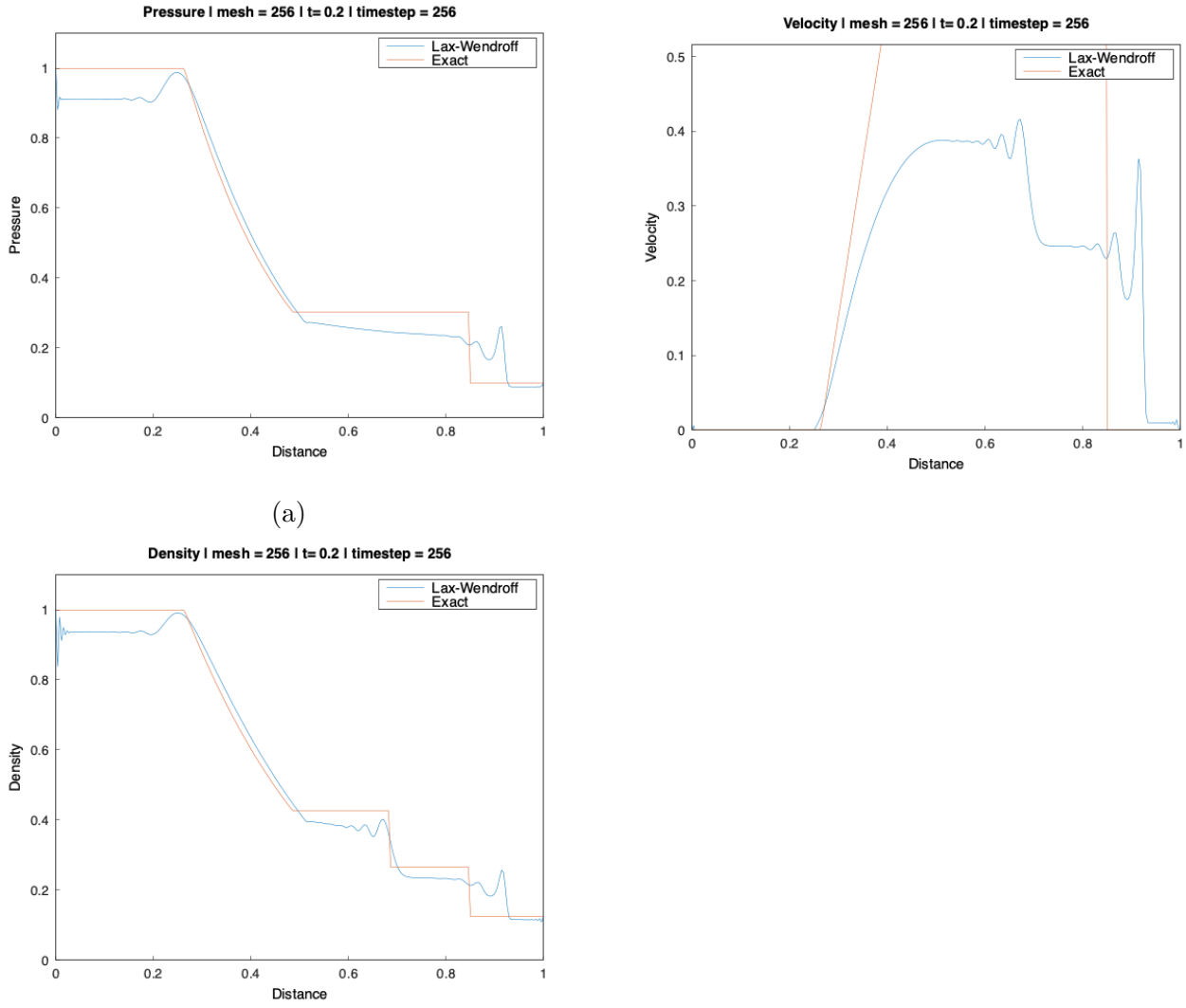
1 General Discussions

I observed that the numerical solution is close to the exact when the artificial viscosity term is used otherwise it becomes chaotic. I used a viscosity of 2.5, although I experimented with others too but I have on shown results for that of 2.5. Another observation is that a larger mesh point improved the results. I chose to do 256 time iterations to reach 0.2 because the 0.005 did not give the same results in the slides. Results have been shown below.
Below are the plots of the results

2 Solution Plots

The graphs below show the solution to the shock tube problem form using Lax-Wendroff.



(a)

Figure 1: A graph of solution to Shock tube problem using lax-wendroff method for euler's 1D equations using mesh points of 256.

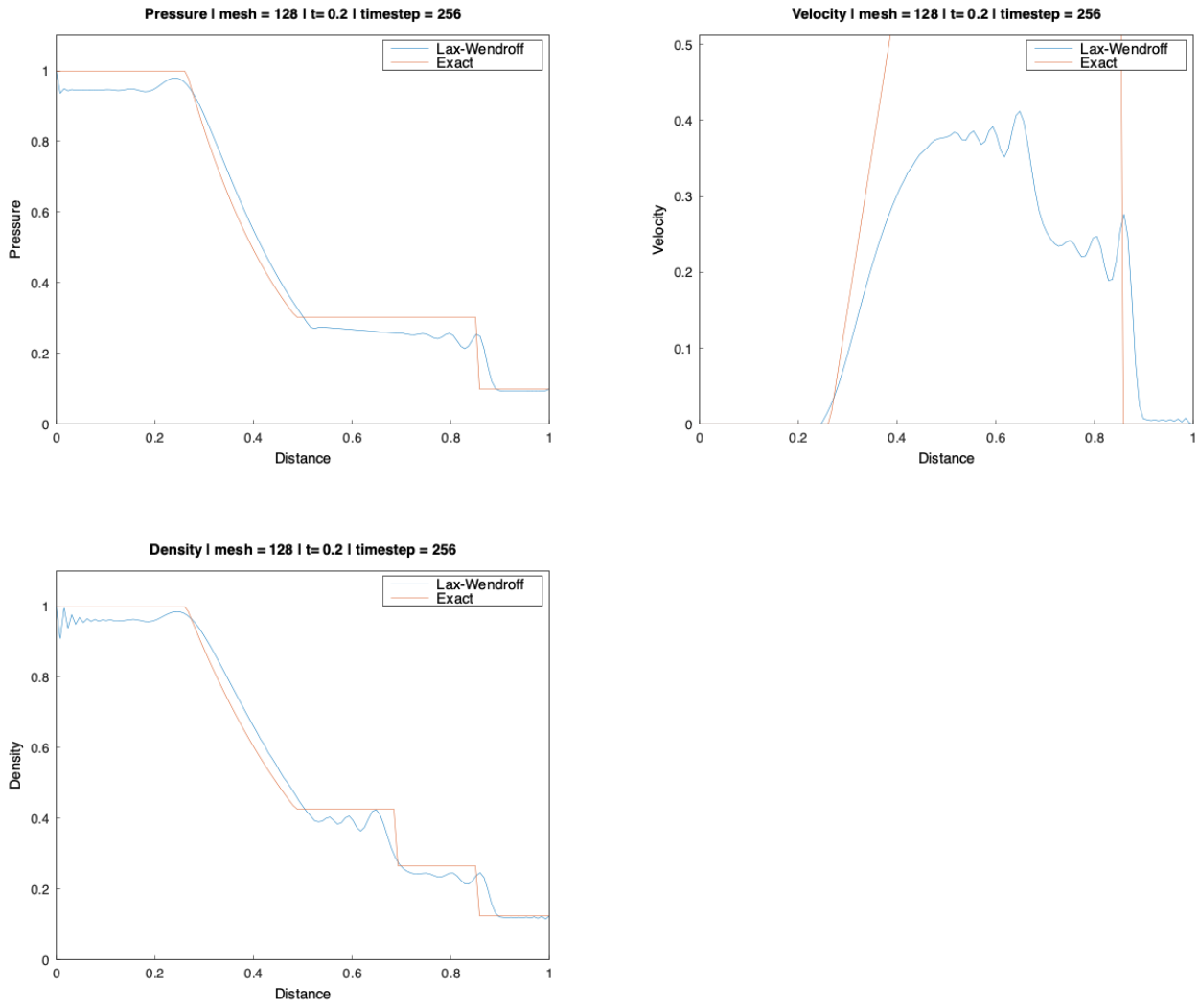


Figure 2: A graph of solution to Shock tube problem using lax-wendroff method for euler's 1D equations using mesh points of 128.

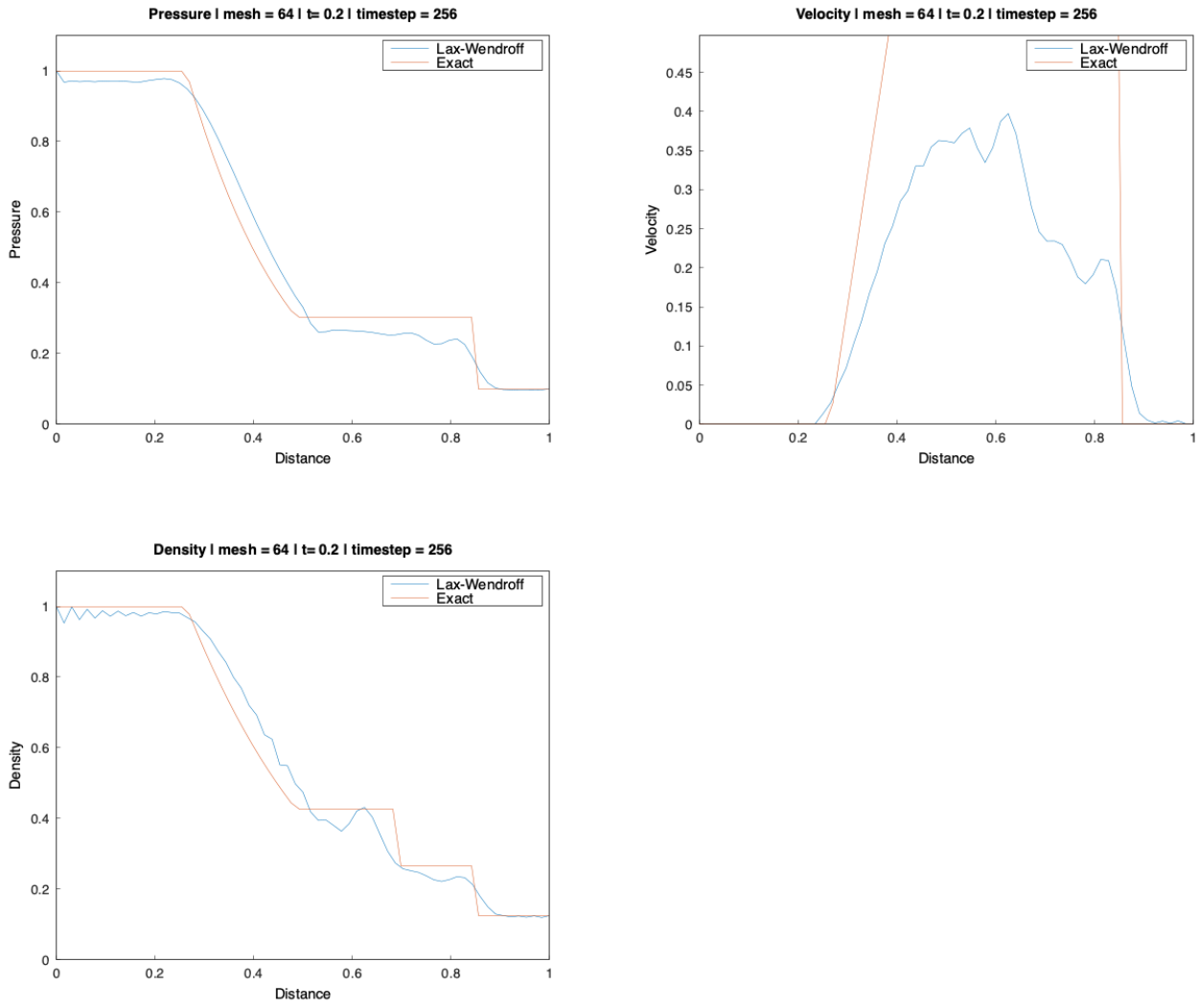


Figure 3: A graph of solution to Shock tube problem using lax-wendroff method for euler's 1D equations using mesh points of 64.

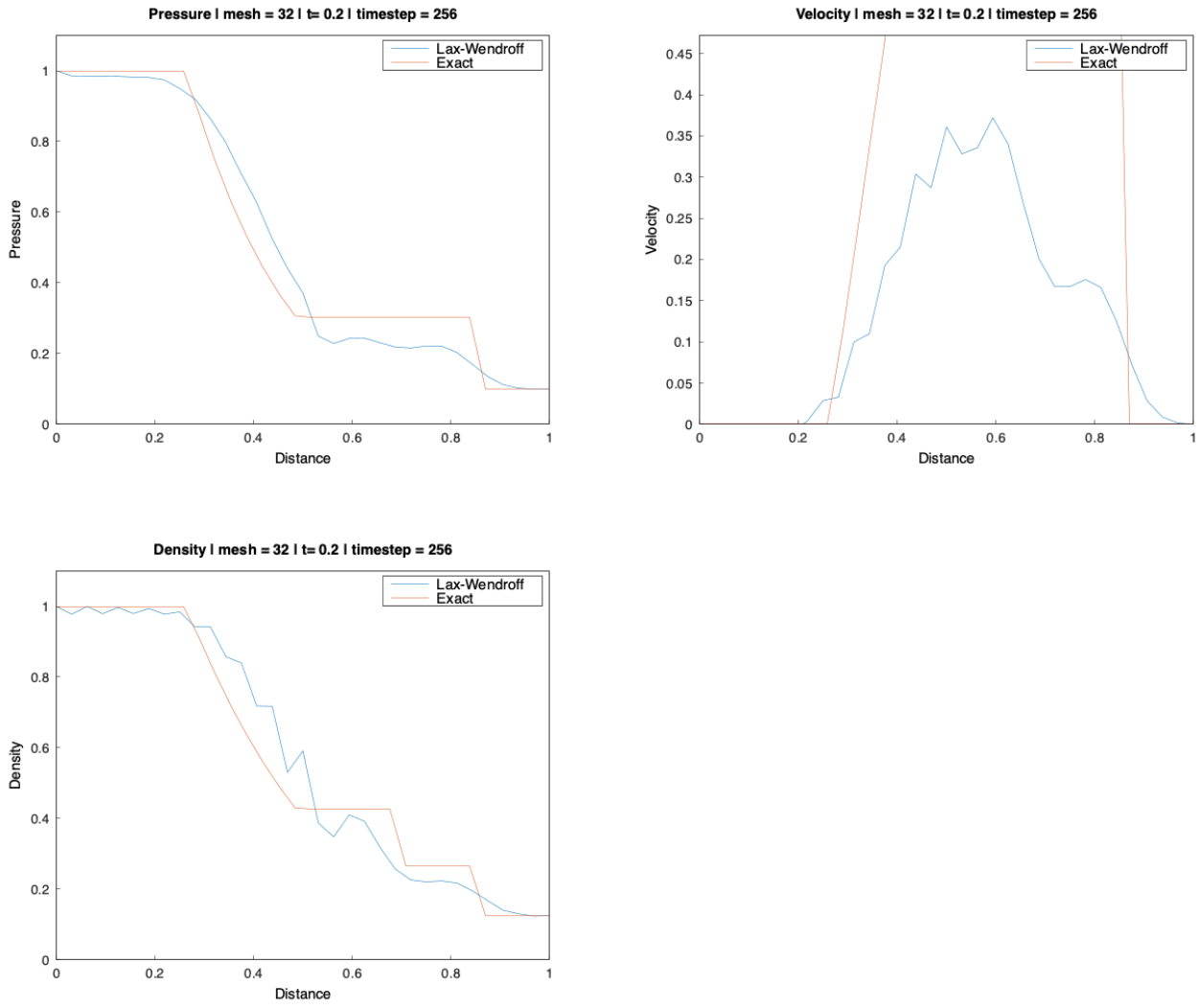


Figure 4: A graph of solution to Shock tube problem using lax-wendroff method for euler's 1D equations using mesh points of 32.