

Computational Fluid Dynamics 1 - HW6

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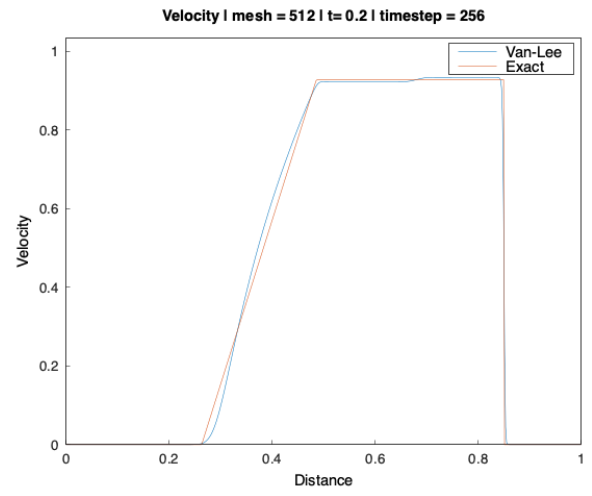
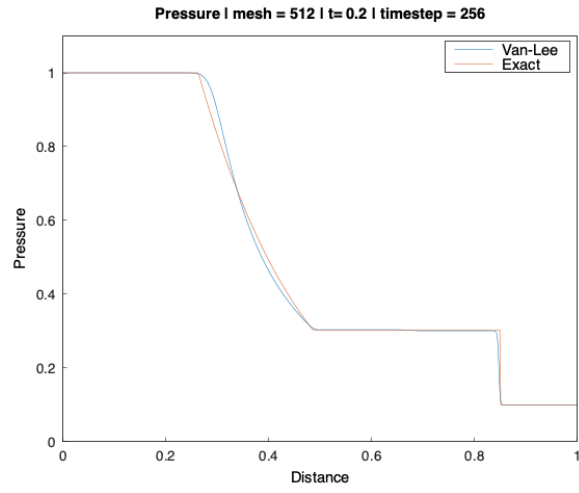
1 General Discussions

I observed that the numerical solution is close to the exact and this method looks more stable than that of the Lax-wendroff method. A larger mesh point improved the results as shown below but a much larger point crashes the program because the numbers in the calculation are sometimes too small for double point precision. 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 from using van-lee method.



(a)

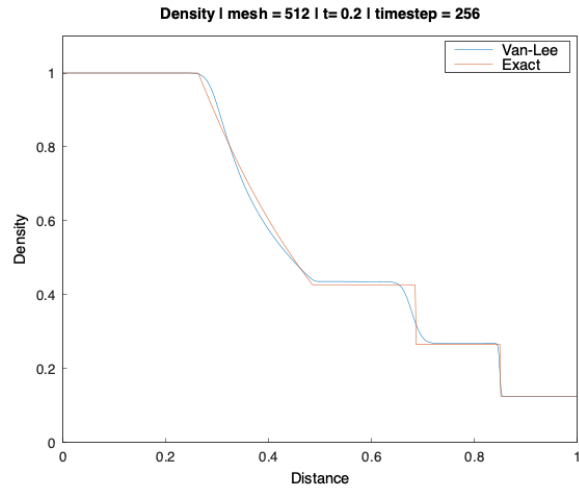
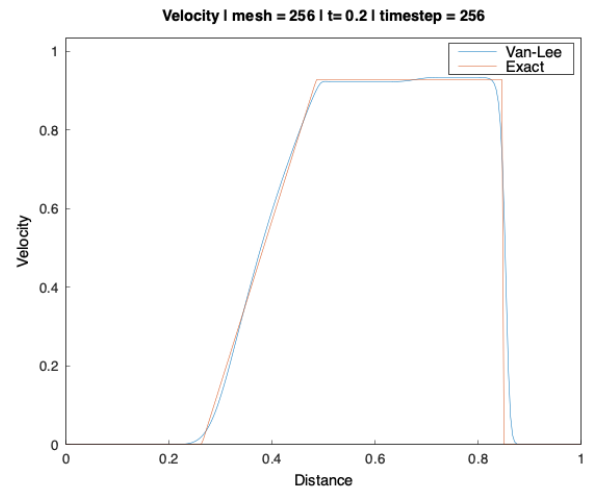
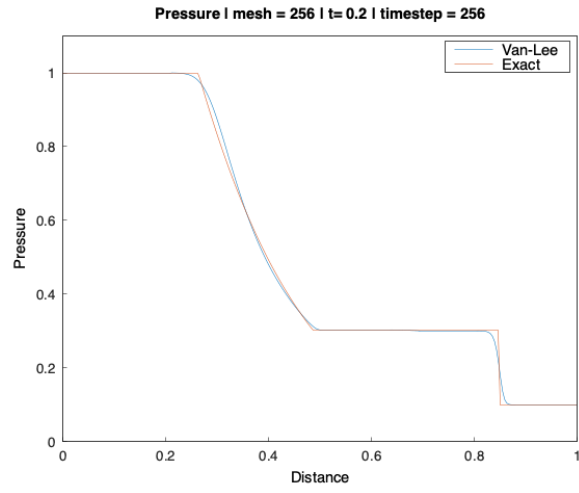


Figure 1: A graph of solution to Shock tube problem using van-lee method for euler's 1D equations using mesh points of 512.



(a)

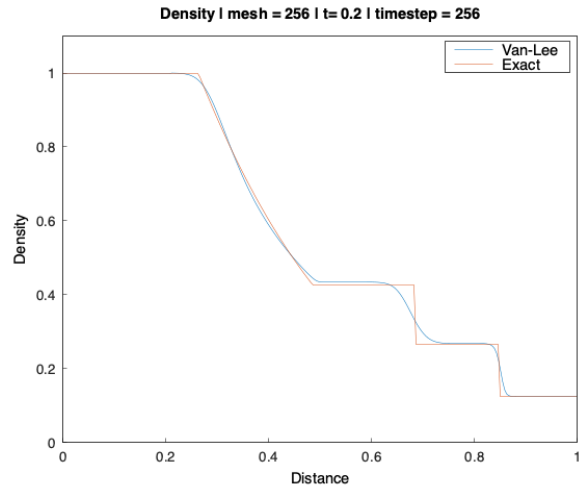


Figure 2: A graph of solution to Shock tube problem using van-lee method for euler's 1D equations using mesh points of 256.

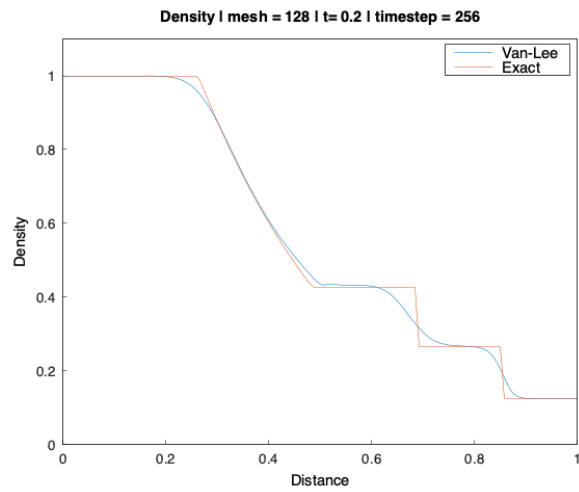
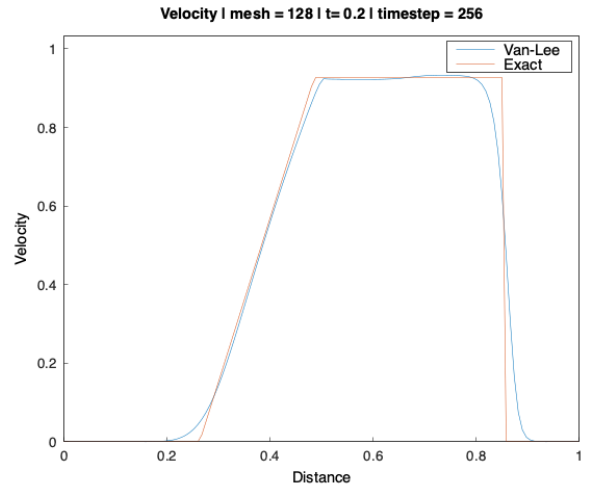
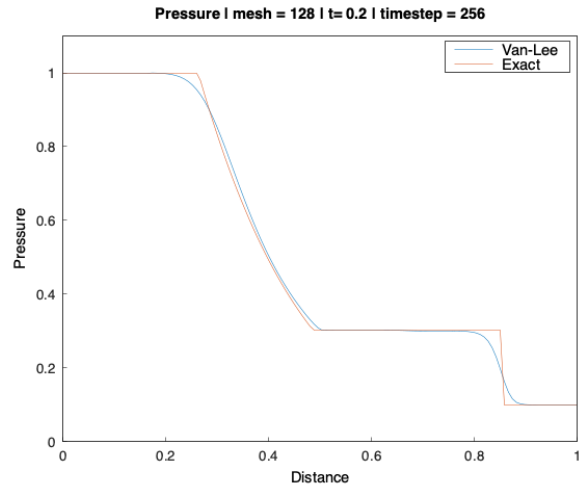


Figure 3: A graph of solution to Shock tube problem using van-lee method for euler's 1D equations using mesh points of 128.

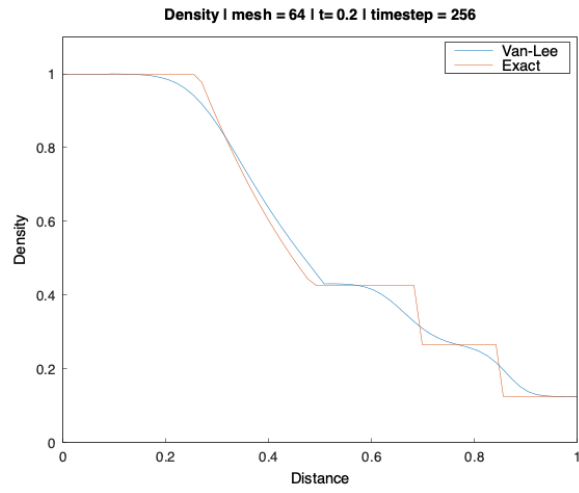
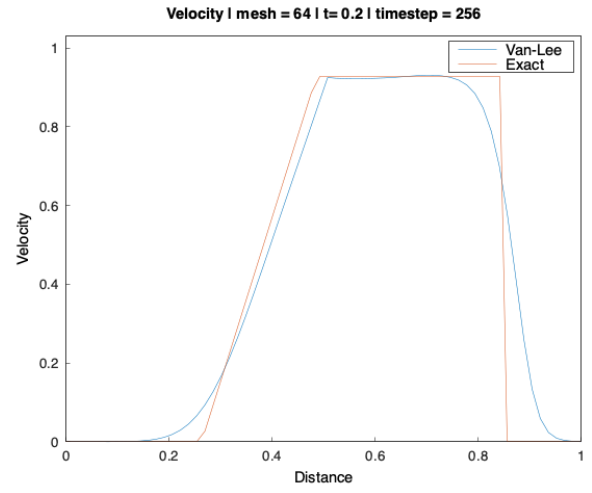
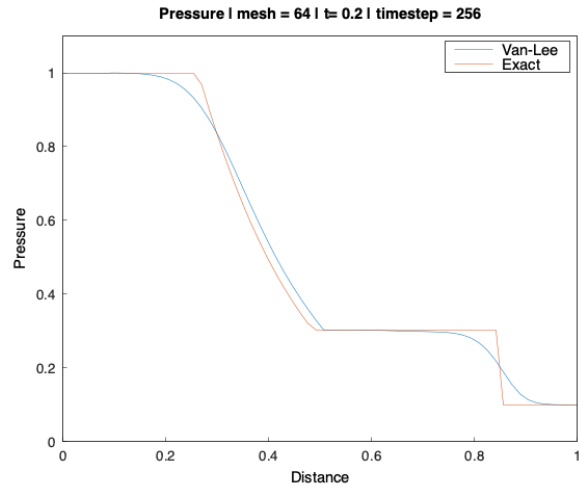


Figure 4: A graph of solution to Shock tube problem using van-lee method for euler's 1D equations using mesh points of 64.

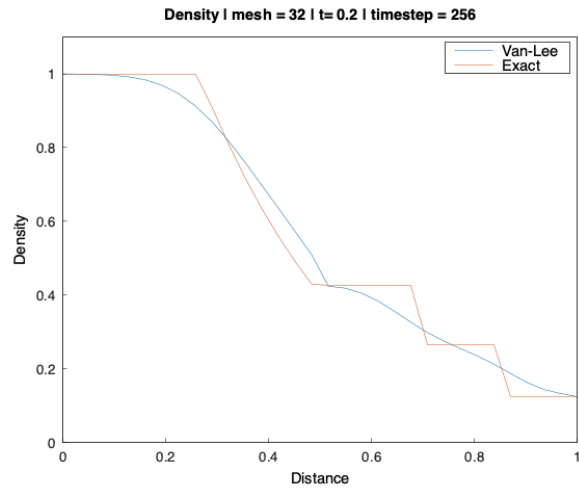
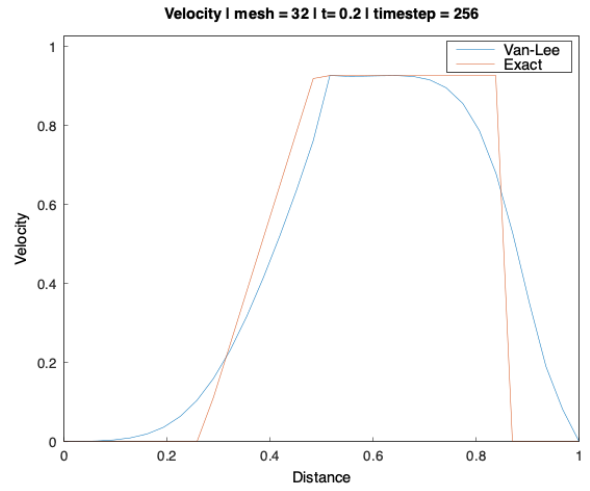
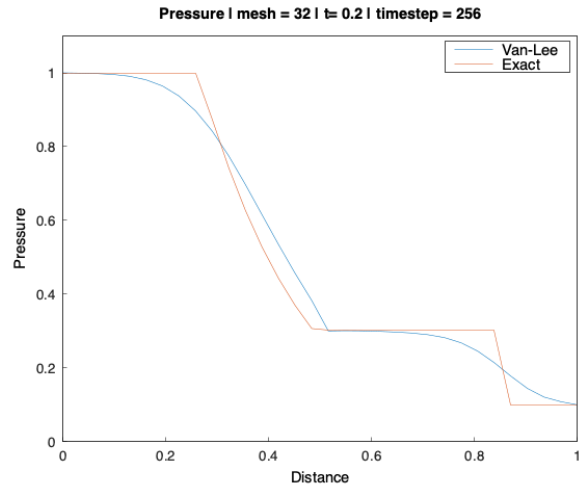


Figure 5: A graph of solution to Shock tube problem using van-lee method for euler's 1D equations using mesh points of 32.