

# Proposed Numerical Project

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## 1 Idea 1:

For my numerical project this semester, I propose to write a simple code to evolve the Euler equations in 1D. Specifically, I will use my scheme to evolve the two Sod test cases as given in Ch. 18 of Computational Gasdynamics. Currently, the exact scheme is open ended, but I was thinking of coding up and testing one of the predictor corrector methods (18.3 or 18.4/18.15). The latter set of equations sound more interesting, which is MacCormack's method, alternating between FTBS and FTFS methods at each time step, and employing a fixed CFL condition.

## 2 Idea 2:

Similar idea, different method. Looking back at some of my MHD research in Minnesota, the code I used (of which I frankly understood very little of what was going on beneath the hood) used something based on a 2nd order Roe-type upwind scheme to evolve the MHD equations. Maybe I could do the Sod tests using section 18.3.2 (Roe's first order upwind method). Glancing at the section, this seems substantially more involved, but also probably more beneficial.