Programming Assignment 4: Compressible Flow

Mech 511 — Spring, 2013

Due date: April 15

Solve the following shock tube problem to $t = 0.15$: $(\rho_L = 6\ u_L = 0\ P_L = 12)$, $(\rho_R = 1\ u_R = 0\ P_R = 1)$. Use at least two of the Steger-Warming, Roe, and AUSM$^+$ schemes, and a mesh with at least 200 points. You should use a second-order accurate discretization in both time and space; this implies that you will need to use a limiter of some sort to preserve monotonicity. Your writeup should identify which schemes you used (including limiter, time-stepping scheme, and time step). Submit plots of ρ, u, P, and T (one plot for each variable, but all schemes plotted together).