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A Second Order Iterative Scheme
for Solving the Cylindrical Shock Problem

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Abstract : In this paper, we iterate the solutions obtained by the Lax-Wendroff(L-W) second order method, to eliminate the post shock non-linear oscillations that take place in an Eulerian description of the cylindrical shock wave. It is shown that the proposed iterative scheme helps in relaxing the Courant-Friedrichs-Lewy (CFL) condition for moderate shock strength. Results obtained are confirmed numerically.

(1) Introduction:

Numerical solutions of the hyperbolic system of equations, that represents the compressible flow of an inviscid gas, is often corrupted by the occurrence of nonlinear oscillations behind the shock wave.

In [1], the authors devised an iterative scheme, that eliminates such oscillations without adding any explicit artificial viscosity terms to the solutions.

They applied their scheme to iterate first and second order solutions, obtained from lagrangian description of one dimensional fluid flow in cartesian coordinates.