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A Modified MacCormack's Explicit Time Marching Scheme for Solving the Conservation equations STEPHEN AKWABOA, FREDERICK FERGUSON, North Carolina A&T State University, CENTER FOR AEROSPACE RESEARCH TEAM — In this study, the classical MacCormack's explicit unsteady scheme is modified and smartly programmed to serve as the basis for a Navier-Stokes solver. A two dimensional code capable of solving the perfect gas dynamic equations is developed. Geometry of particular interest used to solve the fluid flow problem are flow in parallel plates and rearward-facing step. The governing equations are programmed using FORTRAN to solve the 2D planar Navier-Stokes equations. The solution results are visualized using TECPLOT. Supersonic flow over the rearward facing step is strategically solved using a flat plate solution paradigm. Parametric studies performed for the rearward facing step flow indicate that the Mach number and the step height affect flow characteristics such as corner expansion, recirculation zone, and the base pressure which are of great importance in the design of SCRAMJET engine.

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