

Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Hypersonic Boundary Layer/Oblique Shockwave Interaction

HAILE LINDSAY, FREDERICK FERGUSON, North Carolina A&T State University, CENTER FOR AEROSPACE RESEARCH TEAM — The hypersonic boundary layer/oblique shockwave interaction problem was defined with the use of the full Navier-Stokes (NS) equations and a FORTRAN code was developed to provide numerical solutions to this problem. Further, this problem was studied under two specified sets of boundary conditions: adiabatic wall and constant wall conditions. The MacCormack Technique was used in developing this NS code. To validate the numerical code, the flat plate problem was solved, and the results compared to that published in established journals. In solving these problems, engineering tools such as, FORTRAN, TECPLOT, and EXCEL, were used to generate plots of the primitive variables, such as, the velocity components, u and v , density, and the temperature T . Selected plots were reproduced from various references in validating the work done for the flat plate and hypersonic boundary layer/oblique shockwave interaction problems. All preliminary results indicated that the code was validated and the results obtained agreed with the physical behavior of the flow fields. Now that an aerospace engineering tool was developed, it is recommended that future designers seek to further its development by making the code user-friendly and that they further test accuracy of the code by solving other 2D fluid dynamic problems.

Haile Lindsay
North Carolina A&T State University

Date submitted: 03 Aug 2005

Electronic form version 1.4