

Test Calculation of Transonic Flowfield in a Supersonic Nozzle Using the Fluid Numerical Instruments[®] Software Package (FNI)

Objectives:

- to compare the computational results obtained in the FNI package and the experimental results of research in the Jet Propulsion Laboratory of the California Institute of Technology (sponsored by NASA).

The problem definition are referred to the paper “**Flow Phenomena and Convective Heat Transfer in a Conical Supersonic Nozzle**” Back L. H., Cuffel R. F. /California Inst. of Tech., Jet Propulsion lab., Heat transfer and fluid dynamics group, ; Massier P. F., Journal of Spacecraft and Rockets 1967 0022-4650 vol.4 no.8 (1040-1047).

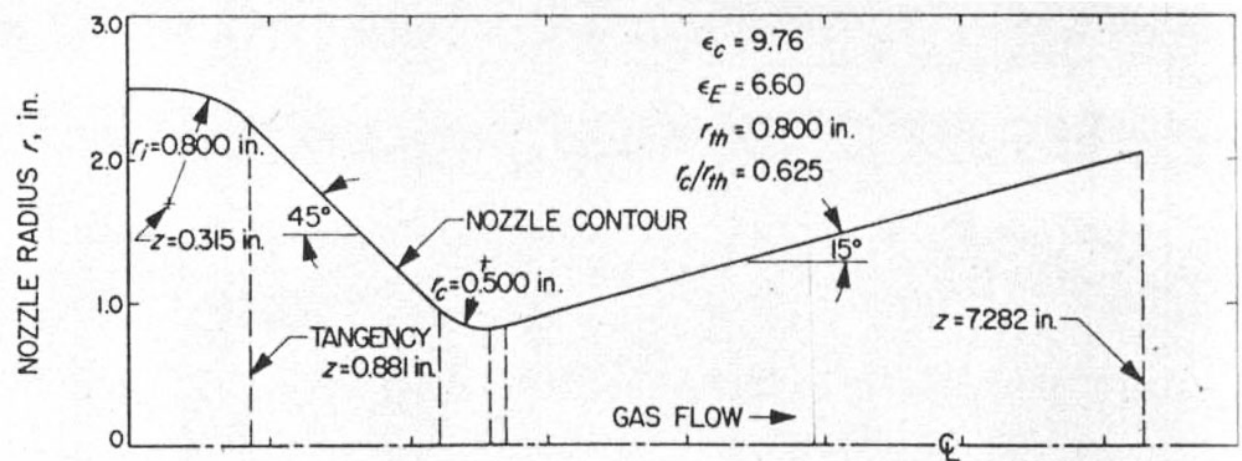


Fig.1. Nozzle Geometry.

Inlet Ttot, (K)	Tw/Ttot	Ptot, (MPa)
833.3	0.39 - 0.55	0.411 – 1.717

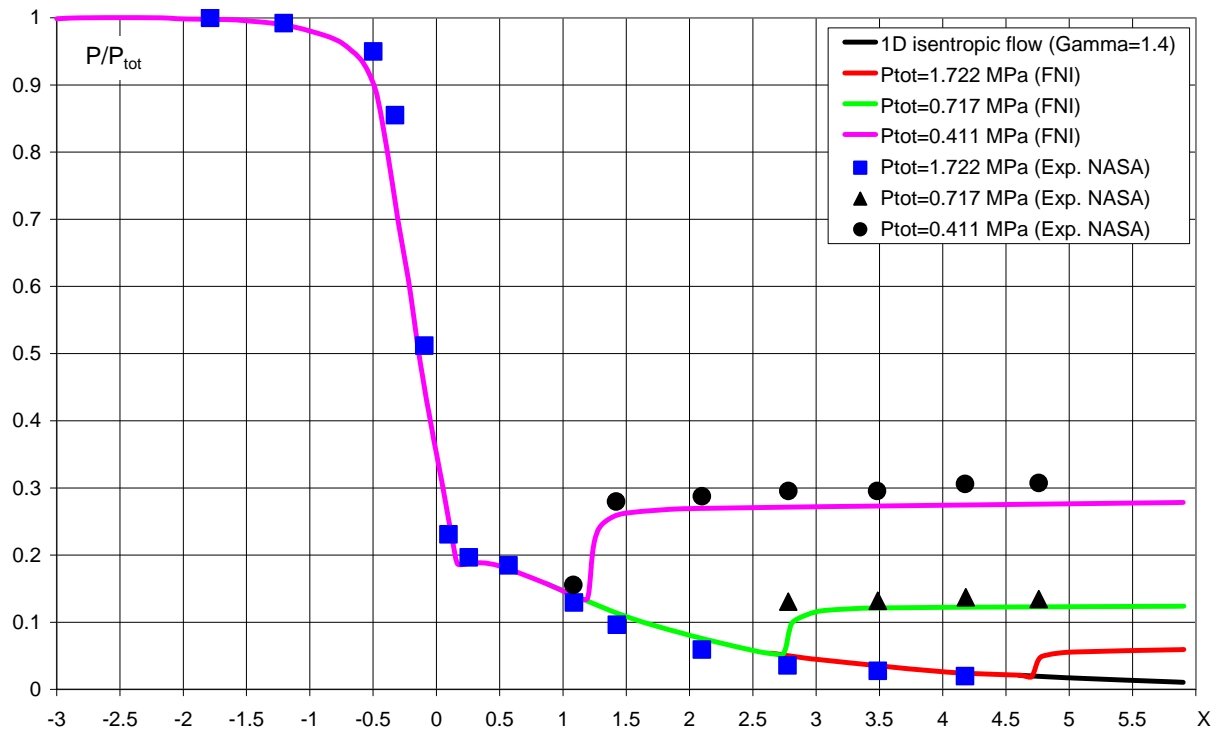


Fig.2. Ratio of static to stagnation pressure along the nozzle axis.

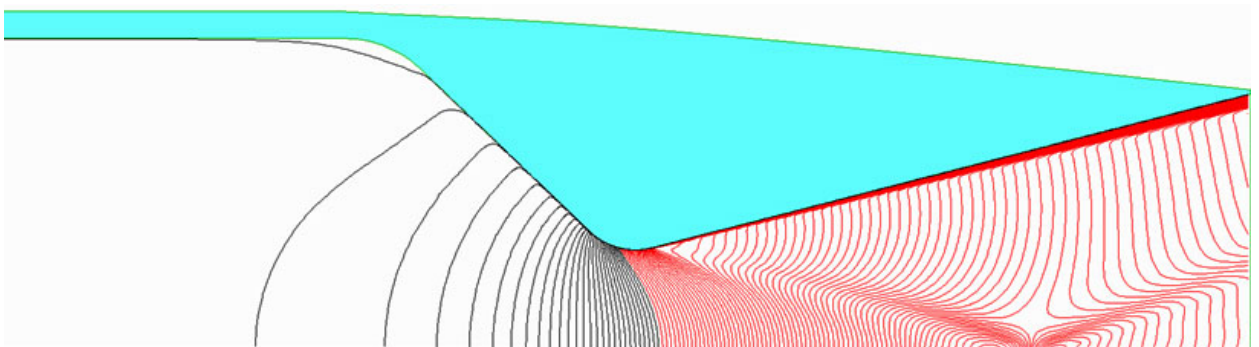


Fig.3. Mach isolines obtained in FNI. Red lines – Mach>1.

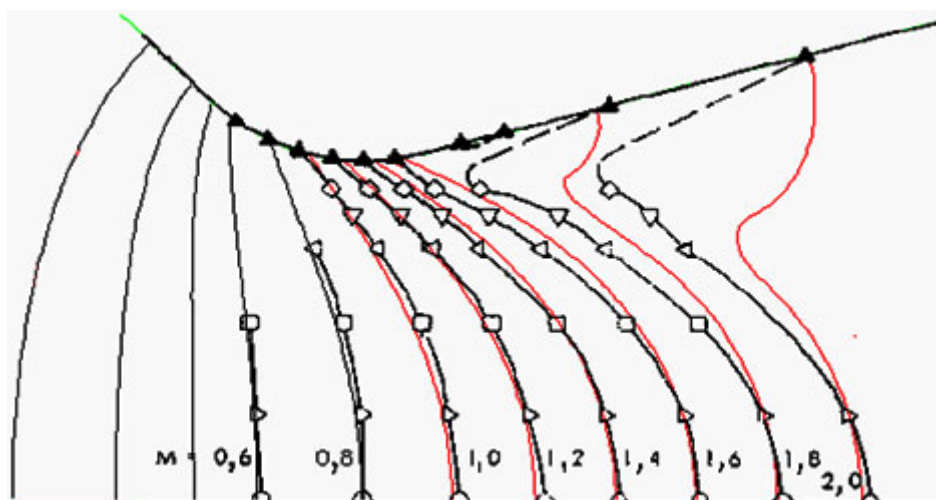


Fig.4. Comparison FNI Mach isolines and experiment Mach isolines (lines with markers).