

Gas Dynamics

Bonus project #1

Worth 3 marks

Due on Saturday, Nov. 19th, 2011 at 2:00 pm

You can send your solution by e-mail (Mohamed.abdelgawad1@eng.au.edu.eg) or hand it to Dr. Mohamed in his office.

An ideal gas enters subsonically and flows isentropically through a *choked* converging-diverging duct having a circular cross-sectional area A that varies with axial distance from the throat, x , according to the formula:

$$A = 0.1 + x^2$$

where A is in square meters and x is in meters. For this flow situation, plot the variation of Mach number, static temperature to stagnation temperature ratio, and static pressure to stagnation pressure ratio (P/P_0), through the duct from $x = -0.6$ m, to $x = 0.6$ m. Change x in steps of 0.1 m.