FLUENT - Compressible Flow in a Nozzle- Problem 2

Author: Rajesh Bhaskaran & Yong Sheng Khoo, Cornell University

Problem 2

Change the exit pressure to 40,000 Pa while keeping all the other boundary conditions the same. What flow regime do you expect for this exit pressure based on the quasi-1D results in problem 1? Re-run the FLUENT calculation with this exit pressure on the 50x20 grid.

(a) Plot contours of the Mach number and static pressure for this case. Is the flow regime as predicted by quasi-1D theory? Explain briefly the possible causes for any similarities or disparities.

(b) Plot the static and stagnation pressures at the axis as a function of the axial distance. Also, plot the corresponding values from the case where the exit pressure is 3,738.9 Pa. (These four curves should be on the same graph.) Explain briefly the salient features of this plot.

(c) Plot the static and stagnation temperatures at the axis as a function of the axial distance. Again provide a brief explanation for the salient features.

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