Section 07: Modelisation and Simulation | Poster number 149

Simulation of viscous compressible flow

Vit Dolejsi, Charles University, Prague.

ABSTRACT

We deal with the numerical simulation of viscous compressible flow in plane domain. We present the system of the Navier-Stokes equations representing the physical model. This hyperbiloc-parabolic system of partial differential equation is very complicated from the mathematical point of view, however we try to solve it numerically. The used computational method is based on a general class of flux vector splitting schemes. We split the system of the Navier-Stokes equations into two subsystems: inviscid system, which is discretized by the finite volume method and the purely viscous system discretized by the finite element method. The characteristic property of the transonic flow is the presence of discontinuities called shock waves. To good capture the shock waves a suitable triangulation has to be used. Therefore the main attention is devoted to adaptive methods. The anisotropic mesh adaption is applied for the generation of suitable triangulation, where very precise solution is reached without enormous requirements for number of triangles. We generate a triangulation, where the so-called interpolation error is uniformly distributed over the whole computational domain. The special procedure is used for effects for viscous compressible flow, as boundary layers and wakes. The numerical results and their comparison with an experiment are presented.

Keywords: *compressible flow, adaptive methods, anisotropic mesh adapation*

Mathematics Subject Classification: *76H05, 76N99, 76R99, 65N50, 65M50*

Contact Address: dolejsi@karlin.mff.cuni.cz