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Title : DEVELOPMENT OF A FINITE VOLUME ALGORITHM ON PARALLEL COMPUTER FOR PREDICTION OF THREE-DIMENSIONAL TURBULENT COMPRESSIBLE FLOWS		Document No. PP CF 8903 Date of issue:
Author(s) : Dr. Sekhar Majumdar		Contents
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Abstract : This project aims at developing a general purpose, user-friendly Computer code for numerical prediction of three dimensional, turbulent, compressible flows solving the time-averaged, Navier Stokes equations in body-fitted non-orthogonal coordinate system. A finite volume method [5] has already been developed by the present investigator and others for incompressible flows employing the concept of the Semi-IMplicit Pressure Linked Equations (SIMPLE) of Patankar & Spalding [6], revised for cell-centred variable arrangement and using Cartesian Velocity Components as dependent variables. The same method is proposed to be modified to account for the compressibility effects and hence to achieve a unified aproach for incompressible and compressible flows. Turbulence will be simulated through the Eddy-Viscosity based two equations (K-ϵ) models on which the present investigator has already gained considerable experience [7 - 10] for both 2D & 3D incompressible flows. In order to meet the large Computer storage and CPU demand for real life 3D problems a parallelised version of the code will be generated, compitable to the in-house MK-II FLOSOLVER at NAL for which however the Computer resources and specially the hardware need to be augmented. How to handle irregular flow geometries, modelling turbulence for 3D separated flows and finally the effective utilisation of parallel computers for large CPU and storage-consuming computer codes form the three-major problems to be studied under this research project.