

Abstract Submitted
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Towards the Study of Flow through Low-Pressure Turbine Cascade by Large-Eddy Simulation Technique¹ SHIRDISH POONDRU, KARMAN GHIA, URMILA GHIA, University of Cincinnati — This study aims to accurately predict and control the flow separation that occurs on the suction side of a LPT cascade, by application of higher-order compact-difference scheme to Large Eddy Simulation (LES) Technique. To achieve this goal, a MPI-based higher-order, Chimera version of the FDL3DI flow solver developed by the Air Force Research Laboratory at Wright Patterson Air Force Base is used. FDL3DI solves the full 3-D Navier-Stokes equations using the LES technique. To understand the LES module of the flow solver, two test cases are solved first: Flow through a channel, and flow past a circular cylinder. A multi-block structured grid is employed for all cases. The solutions obtained compare well with the available results for these flow problems. The study is proceeding to obtain a solution for flow through LPT cascade using the LES technique with dynamic sub-grid scale model, followed by implementation of a flow-control strategy. A parametric study of effect of grid density and location of upstream inflow boundary will also be studied.

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