ACOUSTICS2008/589
Finite Volume Solvers and Moving Least Square Approximations for the Linearized Euler Equations on Unstructured Grids

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This paper presents the application of a high-order finite volume scheme based on the Moving Least Squares approximations (FVMLS) to solve Linearized Euler Equations (EEL) on unstructured grids. The proposed method allows the direct reconstruction of the (convective) fluxes using compact stencils, and without introducing new degrees of freedom, which is a real advantage over the most popular existing high-order methods. This particularity confers to the proposed methodology a significant reduction in workload and memory storage capability. The proposed scheme is compared to a second-order accurate finite volume scheme with centered fluxes around a uniform flow, with absorbing and/or reflecting boundary conditions. Some test cases are used to illustrate the potential of the FVMLS approximations on acoustic wave propagation. The ultimate objective of our research action is to simulate acoustic wave propagation into confined geometries and complex flows provided by subsonic turbomachines.