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An Immersed-Boundary method for deformable bodies at high Reynolds numbers DARIO DE MARINIS[1], Dipartimento di Meccanica, Matematica e Management – Politecnico di Bari, SREENATH KRISHNAN[2], Mechanical Engineering - Stanford University, MARCO DONATO DE TULLIO[3], MICHELE NAPOLITANO[4], GIUSEPPE PASCAZIO[5], Dipartimento di Meccanica, Matematica e Management – Politecnico di Bari, GIANLUCA IACCARINO[6], Mechanical Engineering - Stanford University — With the aim of accurately simulate the flow-field through gas turbine blades a numerical approach is presented, that couples a massively parallel, finite volume Unsteady Reynolds Averaged Navier–Stokes Equations solver with an efficient structural solver describing the dynamics of deformable bodies, using an iterative coupled approach. The numerical strategy is based on a suitable version of the immersed boundary (IB) technique, which is able to handle rigid and deformable complex geometries in turbulent flows. The structures are discretized by a surface mesh of three-node triangular elements and modeled by means of a finite element method. The solution of the fluid-structure-interaction (FSI) problem produces detailed information of the flow patterns through realistic geometries subject to small deformations at high Reynolds and Mach numbers.

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