



Università degli Studi di Pavia

SEMINAR

Immersed b-spline finite elements for fluid-structure interaction

The simulation of the interaction between lightweight structures and fluids is challenging due to the differences in the underlying equations and the length and time scales involved. This talk will introduce a new immersed boundary finite element technique for fluid-structure interaction with geometrically complex interfaces. The viscous, incompressible fluid equations are discretized with b-spline basis functions on a fixed logically Cartesian grid. The fluid-structure interface conditions are enforced with a consistent penalty method as originally proposed by Nitsche. In contrast, the structure is represented by beams, membranes or thin shells and is discretized with subdivision finite elements. The discrete system of fluid-structure equations is solved with a partitioned approach. A number of examples motivated by animal locomotion in air and water will be discussed to showcase the accuracy and robustness of the developed technique.

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