

Università degli Studi di Pavia

Dipartimento di Meccanica Strutturale

In collaborazione con

Centro di Simulazione Numerica Avanzata – CeSNA

Istituto Universitario di Studi Superiori

An introduction to Immersed boundary methods and to its finite element approximation

The Immersed Boundary Method (IBM) has been designed by Peskin for the modeling and the numerical approximation of fluid-structure interaction problems, where flexible structures are immersed in a fluid. In this approach, the Navier-Stokes equations are considered everywhere and the presence of the structure is taken into account by means of a source term which depends on the unknown position of the structure. These equations are coupled with the condition that the structure moves at the same velocity of the underlying fluid. The main advantage of the approximation of this formulation is that one can use independent meshes for the fluid and the structure, avoiding remeshing at each time step. Recently, we have developed a finite element version of the IBM, which offers interesting features for both the analysis of the problem under consideration and the robustness and flexibility of the numerical scheme. In fact, it extends in a natural way to the treatment of both thin and thick structures, whose density is different than the fluid density.

*Prof. Lucia Gastaldi
Dipartimento di Matematica
Università degli Studi di Brescia*

*Prof. Daniele Boffi
Dipartimento di Matematica
Università degli Studi di Pavia*

*Thursday May 27, Aula MS1, 11.15 – 13.30
Dipartimento di Meccanica Strutturale
Via Ferrata, 1 – Pavia*