The Immersed Interface Method Numerical Solutions Of Pdes Involving Interfaces And Irregular Domains Frontiers In Applied Mathematics

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The Immersed Interface Method Numerical

The Immersed Interface Method: Numerical Solutions of PDEs Involving Interfaces and Irregular Domains provides an introduction to the immersed interface method (IIM), a powerful numerical method for solving interface problems and problems defined on irregular domains for which analytic solutions are rarely available. This book gives a complete description of the IIM, discusses recent

progress in the area, and describes numerical methods for a number of classic interface problems.

The Immersed Interface Method | Society for Industrial and ...

This book provides an introduction to the immersed interface method (IIM), a numerical method for solving interface problems and problems defined on irregular domains, where analytic solutions are rarely available. Included is a complete description of the IIM, discussions on progress and a description of numerical methods for interface problems.

The Immersed Interface Method: Numerical Solutions of PDEs ...

The Immersed Interface Method: Numerical Solutions of PDEs Involving Interfaces and Irregular Domains provides an introduction to the immersed interface method (IIM), a powerful numerical method for solving interface problems and problems defined on irregular domains for which analytic solutions are rarely available.

The Immersed Interface Method: Numerical Solutions of PDEs ...

immersed interface method. Introduction The flow of two immiscible fluids is used in many technological appli-cations [1]. The direct numerical simulations of two-fluid problems have a potentially huge domain for increased understanding. Dif-ferent numerical methods have been developed for simulating two-

The immersed interface method for two-fluid problems

The immersed interface method – a numerical approach for partial differential equations with interfaces (1994)

The immersed interface method – a numerical approach for ...

accuracy and convergence properties of the numerical method for solving the Navier-Stokes

equations. An alternative approach is to use the so-called immersed boundary method (IBM) where the equations of interest are discretized on a fixed Cartesian grid in a bounded domain Ω which contain an arbitrary immersed body with

Very High-Order Accurate Sharp Immersed Interface Method ...

The immersed interface method (IIM) is an IB-like approach to FSI that sharply imposes stress jump conditions, enabling higher-order accuracy, but prior applications of the IIM have been largely restricted to numerical methods that rely on smooth representations of the interface geometry.

An immersed interface method for discrete surfaces ...

(2020) Numerical analysis of interface hybrid difference methods for elliptic interface equations. Journal of Computational and Applied Mathematics 377 , 112869. (2020) An augmented immersed finite element method for variable coefficient elliptic interface problems in two and three dimensions.

The Immersed Interface Method for Elliptic Equations with ...

A new immersed interface method, the algebraic immersed interface and boundary (AIIB) method, which uses algebraic manipulations and compact stencil discretizations, has been presented. This method is able to treat elliptic equations with discontinuous coefficients and solution jumps over complex interfaces.

The Algebraic Immersed Interface and Boundary Method for ...

Book: The Immersed Interface Method -- Numerical Solutions of PDEs Involving Interfaces and Irregular Domains, Zhilin Li and Kazufumi Ito, SIAM Frontiers in Applied mathematics, 33, Philadelphia, 2006, ISBN: 0-89871-609-8.

Zhilin Li

Z. Li, K. ItoThe Immersed Interface Method: Numerical Solutions of PDEs Involving Interfaces and Irregular Domains

A level-set immersed interface method for simulating the ...

The immersed solid method is advantageous with its low cost and simplicity. More significantly, it enables the conservative momentum exchange by the numerical integral in equation (16) using the common computational cell for fluid flow simulation.

Immersed boundary/solid method for the numerical ...

In computational fluid dynamics, the immersed boundary method originally referred to an approach developed by Charles Peskin in 1972 to simulate fluid-structure interactions. Treating the coupling of the structure deformations and the fluid flow poses a number of challenging problems for numerical simulations. In the immersed boundary method the fluid is represented on an Eulerian coordinate and the structure is represented on a Lagrangian coordinate. For Newtonian fluids governed by the incompr

Immersed boundary method - Wikipedia

the immersed interface method for certain one-dimensional nonlinear problem with a fixedinterface. However, for the interface problems discussed here the interface is unknown and moving, and the discrete difference scheme is a nonlinear system of equations involving both the solution and the interface.

Immersed interface methods for moving interface problems

The immersed boundary method is a numerical method in computational fluid dynamics where the flow boundary, e.g., the surface of a solid body in contact with the fluid or the interface between

two immiscible fluids, is immersed in the mesh that does not conform with the boundary.

Immersed Boundary Method | SpringerLink
In this article, we analyze the Petrov-Galerkin immersed finite element method (PG-IFEM) when applied to one-dimensional elliptic interface problems. In the PG-IFEM (T. Hou, X. Wu and Y. Zhang, Commu...

Inf-sup stability of Petrov-Galerkin immersed finite ...
Our method is based on the Immersed Interface Method (IIM) that was first introduced by LeVeque and Li in [42] as a second order accurate finite difference type method for solving elliptic equation whose solution is not smooth across the interface, due to discontinuous coefficients or singular source terms in the equation.

An Immersed Finite Element Method and its Application to ...
, The immersed interface method: Numerical solutions of PDEs involving interfaces and irregular domains volume 33 of Frontiers in Applied Mathematics, Society for Industrial and Applied Mathematics (SIAM), Philadelphia, PA, 2006.