Interdisciplinary Center for Scientific Computing

UNIVERSITÄT HEIDELBERG
ZUKUNFT SEIT 1386

IWR COLLOQUIUM WINTER SEMESTER 2024/25

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Cut Finite Element Methods

In this talk, I will introduce Cut Finite Element Methods **(CutFEM)** for interface problems and present recent developments, such as mass conservation, within this class of unfitted finite element techniques. Finite Element Methods (FEM) are widely used to approximate solutions to partial differential equations (PDEs) in complex geometries, but they typically require conforming computational meshes. The goal of CutFEM is to allow interfaces or boundaries to intersect the computational mesh arbitrarily while preserving desirable properties of standard FEM. I will explain how CutFEM maintains accuracy and avoids ill-conditioning of linear systems, even with unfitted meshes. I will begin with stationary problems, and then present our approach for discretizing time-dependent PDEs in evolving domains, and demonstrate its application to simulations of surfactant dynamics in incompressible two-phase flow systems.

Also streamed via Zoom

January 15, 2025 • 16:15

Mathematikon • Conference Room / 5th Floor
Im Neuenheimer Feld 205 • 69120 Heidelberg
www.iwr.uni-heidelberg.de/events/iwr-colloquium

HGS MathComp Mixer
Prior to the IWR-Colloquium: Get-together for all members of the HGS MathComp
15:45 · Mathematikon · Common Room / 5th Floor