

Sonderforschungsbereich 1060

The Mathematics of Emergent Effects

Einladung zu einem Vortrag im SFB-Seminar

Dr. Susanne Claus

University of Cardiff, Wales, UK

spricht zum Thema

A novel unfitted finite element framework

Zeit: Dienstag, den 18. August 2015, 14.15 Uhr

Ort: Lipschitz-Saal 1.016, Endenicher Allee 60

Kaffee/Tee: anschl. im Plücker-Raum 1.015

gez. Michael Griebel

Abstract: In this presentation, we will give an overview over CutFEM, a novel technique for robust and accurate numerical FEM approximations of multi-physics problems on cut geometries.

In the CutFEM approach, the boundary of a given domain represented by e.g. a level set function is allowed to cut through the elements of a fixed and regular background grid. The background grid is then also used to represent the approximate solution of the governing partial differential equations (PDE) and the weak form of the equations is evaluated on cut elements of complex shape in the boundary region. This allows a discretisation of the PDE independent of the geometric description of the domain and the associated mesh generation and therefore provides means to efficiently solve problems involving complex and evolving geometries.

In this presentation, we will discuss how stabilisation techniques can be applied to make both the accuracy of the approximation and the system condition number independent of the mesh/boundary intersection and physical parameters and we will give examples of how CutFEM combined with Nitsche's method is implemented for a wide range of problems in the bulk, on surfaces and for multi-physics problems.