

Composite Finite Elements

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Abstract

Composite Finite Elements are a new class of finite elements for the discretization of boundary value problems with complicated structures, e.g., in the geometry of the physical object and/or in the coefficients of the differential operator and boundary conditions. In contrast to standard finite elements, the minimal dimension of the approximation space is independent of the geometric details and this is especially advantageous for problems on domains with complicated micro-structures. In our talk, we will introduce this discretization method for different kinds of applications such as Poisson-type equations, Lamé equation, and Stokes equation. We will analyse its convergence in an a-priori and a-posteriori way and illustrate the analysis by numerical experiments.