

CNASC Seminar

Speaker

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1pm, HH-3017**

A new mixed finite-element method for the biharmonic problem

Abstract:

Fourth-order differential operators often appear in mathematical models of thin films and plates, and pose significant challenges in numerical simulation over equations governed by more familiar second-order operators. In this talk, we present a three-field mixed finite-element formulation for the biharmonic problem, with some focus on what happens with different boundary conditions. This formulation is based on introducing the gradient of the solution as an explicit variable, constrained using a Lagrange multiplier. As a result, the problem is rewritten as a saddle-point system, requiring specialized analysis of the finite-element discretization and construction of optimal linear solvers. Here, I will discuss the analysis of well-posedness and accuracy of the finite-element formulation, as well as first steps towards developing multigrid solvers for the resulting linear systems.