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Computational

The finite element method is the most widely used method for solving problems of engineering and mathematical models. Typical problem areas of interest include the traditional fields of structural analysis, heat transfer, fluid flow, mass transport, and electromagnetic potential. The FEM is a particular numerical method for solving partial differential equations in two or three space variables. To solve a problem, the FEM subdivides a large system into smaller, simpler parts that are called fini

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this case are Maxwell's equations in various formulations.

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The authors give an introduction to the finite element method as a general computational method for solving partial differential equations (PDEs) approximately. ... The book should be accessible to students with only knowledge of calculus of several variables, basic partial differential equations, and linear algebra, as the necessary concepts from more advanced analysis are introduced when needed.

The Finite Element Method: Theory, Implementation, and ...
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This leads to solutions featuring unrealistically high ionic concentrations in the regions subject to external potentials, in particular, near highly charged surfaces. A modified form of the Poisson-Nernst-Planck equations accounts for steric effects and results in solutions with finite ion concentrations. Here, we evaluate numerical methods for solving the modified Poisson-Nernst-Planck

equations by modeling electric field-driven transport of ions through a nanopore.

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Finite Element Methods for Computational Fluid Dynamics: A ...
Erik Burman is the Chair of Computational Mathematics at UCL since 2013. He defended his PhD thesis, "Adaptive finite element methods for compressible two-phase flows" at Chalmers University of Technology in 1998. Then spent two years as a post doc at Ecole Polytechnique working on adaptive methods in computational combustion.

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Finite Element Methods for Computational Fluid Dynamics: A Practical Guide explains the basics of the finite element method (FEM) in the context of simple model problems, illustrated by numerical examples. It comprehensively reviews stabilization techniques for convection-dominated transport problems, introducing the reader to streamline diffusion methods, Petrov-Galerkin approximations, Taylor-Galerkin schemes, flux-corrected transport algorithms, and other nonlinear high-resolution schemes ...

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The purpose of this dissertation is to present original results for the development, analysis and application of numerical finite element algorithms in the field of linear poroelasticity. A fully coupled finite element method involving continuous elements for displacements and a mixed space for flow is developed (CG/Mixed). Existence, uniqueness and optimality results are provided.

Finite element methods in linear poroelasticity ...
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design guidelines for glass-fiber reinforced polymer (GFRP) guyed tower. Both material testing and t.

Finite element method for the static and dynamic analysis ...
The finite element method (FEM) is used to find approximate solution of partial differential equations (PDE) and integral equations.

Computational electromagnetics - Wikipedia
The Finite Element Method results in inaccuracies for temperature changes at the boundary if the mesh is too coarse in comparison with the applied time step. Oscillations occur as the adjacent elements balance the excessive energy of the boundary element.

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