Potential-based Finite Element Schemes For Eddy Current Problems

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The potential-based nodal finite element methods (A-Ф/T-Ψ schemes) are used to solve 3D transient and harmonic eddy current problems. Although introducing a vector potential and a scalar potential increases the number of unknowns and equations, these apparent complications are justified by a better way of dealing with possible discontinuities in the process of numerical schemes. These schemes presented in this talk are added the penalty function terms in their governing equations to guarantee the existence and uniqueness of approximating solutions. Some energy-norm error estimates of the schemes are given and several computer simulation results from TEAM Workshop Problem 7 and IEEJ model are shown to verify the validity of the schemes.

Speaker Biography

Dr. Tong Kang is a professor from Department of Applied Mathematics, School of Sciences, Communication University of China. He graduated from Institute of Computational Mathematics, Chinese Academy of Sciences (CAS) in 2001. Later he worked as a Postdoctoral Researcher respectively at Institute of Mathematics, CAS during 2001-2003 and at POSTECH, South Korea during 2003-2004. He visited Department of Mathematics at Michigan State University in 2006, the Research Laboratory of Electronics at MIT in 2008 and Combinatorial & Computational Mathematics Center, POSTECH. His interests include computational mathematics, numerical analysis, and computational electromagnetism.

Host: Prof Tai Xue-Cheng, Division of Mathematical Sciences, School of Physical and Mathematical Sciences

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