1067-65-87 **Jintao Cui*** (cui@math.lsu.edu), 3650 Nicholson Drive, Apt. 2146, Baton Rouge, LA 70802.

Hodge Decomposition and Maxwell's Equations.

In this talk we propose a new numerical approach for two-dimensional Maxwell's equations that is based on the Hodge decomposition for divergence-free vector fields. An approximate solution for Maxwell's equations is obtained by solving standard second order scalar elliptic boundary value problems. We illustrate this new approach by a P_1 finite element method. We will present both theoretical and numerical results. This is joint work with Susanne C. Brenner, Zhe Nan and Li-yeng Sung. (Received July 21, 2010)