Dispersion Minimized Compatible Discretizations for Maxwell's Equations in Linear Dispersive Materials

Vrushali Bokil

Department of Mathematics
Oregon State University

Date: 3/24/17
Time: 3:00 PM
Location: COB 110

For more information contact:
Boaz Ilan; bilan@ucmerced.edu

ABSTRACT

In this talk, we present the construction of a numerical method for time domain electromagnetic wave propagation in linear dispersive media based on an optimization procedure called M-adaptation. The dispersive effects are captured by appending to Maxwell's equations ordinary differential equations in time for the evolution of the polarization or magnetization in the materials. These differential equations model material responses to the incident electric and magnetic fields, such as relaxation or resonance processes. The M-adaptation technique is based on the idea of numerical dispersion minimization and results in a method with fourth order numerical dispersion error. This is joint work with Nathan Gibson in the department of Mathematics at Oregon State University, Vitaliy Gyrya in the Applied Mathematics and Plasma Physics group at Los Alamos National Laboratory, and Duncan McGregor in the Computational Multiphysics group at Sandia National Laboratory.

BIO:

Dr. Bokil received her Ph.D. in Mathematics from the University of Houston in 2003 under the direction of Professor Roland Glowinski. From 2003-2006, she was a postdoctoral research associate at the Center for Research in Scientific Computation at North Carolina State University, under the mentorship of Professor H.T. Banks. Dr. Bokil joined the Department of Mathematics at Oregon State University in Fall 2006, and is now an associate professor. She lives in Corvallis, OR with her husband and two children.