Department of Mathematical Sciences Colloquium

VRUSHALI A. BOKIL
North Carolina State University

A Computational and Statistical Framework for Multidimensional Domain Acoustooptic Material Interrogation

We consider an electromagnetic interrogation technique in two dimensions for identifying the dielectric parameters of a first order dispersive dielectric (Debye medium). In this technique a travelling acoustic pressure wave in the Debye medium is used as a virtual reflector for an interrogating microwave electromagnetic pulse that is generated in free space. The reflections of the microwave pulse from the air-Debye interface and from the acoustic pressure wave are recorded at a remote antenna. The data is used in an inverse problem formulation to estimate the locally pressure dependent dielectric parameters of the Debye medium. Using statistical error analysis we construct confidence intervals for all the presented estimates, thereby providing a probabilistic statement about the computational procedure with uncertainty aspects of estimates. Relevant applications include noninvasive interrogation of living tissue to detect anomalies such as cancerous tumors.

Tuesday, February 14, 2006, at 3 pm in Bell Hall 143
The University of Texas at El Paso

Please note the unusual time for the Colloquium.

Refreshments will be served in front of the colloquium room 15 minutes before the start of the colloquium.

For further information, please contact Dr. Pavel Šolín, Bell Hall 220. Phone: (915) 747-6770, email: `solin@utep.edu`.