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Nathan L. Gibson* (gibsonn@math.oregonstate.edu). *Electromagnetic Relaxation Time Distribution Inverse Problems in the Time-domain.*

We consider wide bandwidth electromagnetic pulse interrogation problems for the determination of dielectric response parameters in complex dispersive materials. We couple Maxwell's equations with an auxiliary ODE modeling dielectric polarization. A problem of particular interest is to identify parameters in a standard polarization model (e.g., Debye or Lorentz) using time-domain electric field data. A larger class of materials (e.g., anomalously dispersive media) can be represented by assuming distributions of parameters (e.g., relaxation times). We present results for an inverse problem for the relaxation time distribution based on a least squares cost functional and utilizing generalized Polynomial Chaos in the forward problem. (Received September 15, 2010)