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James V Lambers* (James.Lambers@usm.edu), Department of Mathematics, University of Southern Mississippi, 118 College Dr #5045, Hattiesburg, MS 39406-0001. *A Spectral Time-Domain Method for Computational Electrodynamics*. Preliminary report.

The finite-difference time-domain method has been a widely-used technique for solving the time-dependent Maxwell's equations. This talk presents an alternative approach in the case of spatially-varying coefficients, based on Krylov subspace spectral (KSS) methods. KSS methods for scalar time-dependent PDE compute each Fourier coefficient of the solution using techniques developed by Golub and Meurant for approximating elements of functions of matrices by Gaussian quadrature in the spectral domain. We show how they can be generalized to systems of equations, such as Maxwell's equations, by choosing appropriate basis functions. We also discuss the implementation of appropriate boundary conditions. (Received September 23, 2009)