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James V Lambers* (James.Lambers@usm.edu), 118 College Dr #5045, Hattiesburg, MS 39406-0001. *Solution of Time-Dependent PDE Through Component-Wise Approximation of Matrix Functions*. Preliminary report.

Krylov subspace spectral (KSS) methods are high-order accurate, explicit time-stepping methods for linear PDE with stability characteristic of implicit methods. This “best-of-both-worlds” compromise is achieved by computing each Fourier coefficient of the solution using an individualized approximation, based on techniques from “matrices, moments and quadrature” for computing bilinear forms involving matrix functions. In this talk, it will be shown how this approach can be generalized to obtain high-order accuracy in time, with favorable scalability properties, for nonlinear PDE. (Received September 14, 2011)