1106-65-1049 **Harish P. Bhatt*** (hpb2e@mtmail.mtsu.edu), 2850 Middle Tennessee Blvd. Apt # D12, Murfreesboro, TN 37130, and **Abdul Q. M. Khaliq** (abdul.khaliq@mtsu.edu). *The Locally Extrapolated Exponential Time Differencing LOD Scheme for Multidimensional Reaction-Diffusion Systems.*

In this paper, a local extrapolation of first order locally one-dimensional exponential time differencing scheme is introduced for numerical solution of multidimensional nonlinear reaction-diffusion systems. This novel scheme has the benefit of solving multidimensional problems in locally one dimensional fashion by implementing sequences of tridiagonal matrix solvers instead of solving a band system. The storage size needed for solving systems in higher dimensions with this scheme is similar to that needed for one spatial dimension systems. Stability analysis shows that the scheme is strongly stable and is particularly beneficial to nonlinear partial differential equations with irregular initial data or discontinuity involving initial and boundary conditions due to its ability to damp spurious oscillations caused by high frequency components in the solution. The order of convergence of the scheme is examined numerically and found to be second order accurate in both time and space. To investigate the performance of the novel scheme, we tested it on a three-dimensional enzyme kinetics of Michaelis-Menten type, two and three-dimensional Brusselator system and two-dimensional Schnakenberg model. The numerical experiments showed that the new scheme is efficient and reliable. (Received September 12, 2014)