

1106-65-492

**Emmanuel Asante-Asamini\*** (eoa@uwm.edu), Department of Mathematical Sciences, University of Wisconsin-Milwaukee, Milwaukee, WI 53201-0413, **Abdul Q.M. Khaliq** (abdul.khaliq@mtsu.edu), Department of Mathematical Sciences, & Center for Computational Science, Middle Tennessee State University, Murfreesboro, TN 37132, and **Bruce A. Wade** (wade@uwm.edu), Department of Mathematical Sciences, University of Wisconsin-Milwaukee, Milwaukee, WI 53201-0413. *A Real Rational Poles Exponential Time Differencing Scheme for Nonlinear Advection-Diffusion-Reaction Systems.*

A second order Exponential Time Differencing (ETD) method for advection-diffusion-reaction systems which uses a real rational pole discretization method for the underlying matrix exponentials is developed. The method is proven to be stable and second order convergent. Through numerical experiments it is demonstrated to be highly efficient. We discuss several advantages over competing second order schemes, and develop examples using operator splitting in several space dimensions to confirm empirically the effectiveness of the proposed scheme. (Received August 30, 2014)