1071-65-127 **Xinfeng Liu*** (xfliu@math.sc.edu), Department of Mathematics, University of South Carolina, Columbia, SC 29063, and **Qing Nie** (qnie@math.uci.edu), Department of Mathematics, University of California at Irvine, Irvine, CA 92697. *Implicit integration factor methods for stiff systems.*

Implicit integration factor (IIF) method, a class of efficient semi-implicit temporal scheme, was introduced recently for stiff reaction-diffusion equations. Advection-reaction-diffusion equations are traditionally difficult to handle numerically. For reaction-diffusion systems with both stiff reaction and diffusion terms, implicit integration factor (IIF) method and its high dimensional analog compact form (cIIF) serve as an efficient class of time-stepping methods. For nonlinear hyperbolic equations, weighted essentially non-oscillatory (WENO) methods are a class of start-of-the-art schemes with uniform high order of accuracy in smooth regions of the solution, which can also resolve the sharp gradient in accurate and essentially non-oscillatory (ENO) fashion. In this talk, IIF/cIIF is coupled with WENO by the second-order symmetric operator splitting approach to solve advection-reaction-diffusion equations. In the methods, IIF/cIIF methods treat the stiff reaction-diffusion equations, and WENO methods handle hyperbolic equations that arise from the advection part. In addition, we present a method for integrating IIF/cIIF with adaptive mesh refinement (AMR) to take advantage of the excellent stability condition for IIF/cIIF. (Received February 28, 2011)