1048-65-276 **Sun young Bu*** (agatha@email.unc.edu), **Jingfang Huang** and **Michael Minion**.

Semi-implicit Preconditioning Techniques for Krylov Deferred Correction Methods.

In the recently developed Krylov deferred correction (KDC) methods for differential equation initial value problems, a Picard-type collocation formulation is preconditioned using low order time integration schemes coupled with the spectral deferred correction (SDC) ideas, and the resulting system is solved efficiently using the Newton-Krylov methods. Existing analyses show that the new KDC methods are of arbitrary order and A-stable. In this paper, we further improve the efficiency of the KDC methods by introducing the semi-implicit preconditioning scheme (SI-KDC), in which the stiff component is solved by implicit schemes and the nonstiff parts by explicit methods. Compared with the fully implicit KDC (FI-KDC) methods, preliminary analyses show that the convergence of Newton-Krylov iterations in the SI-KDC methods is similar to that in FI-KDC, while for systems with a nonlinear non-stiff component and a linear stiff part, the SI-KDC can greatly reduce the computational cost in each spectral deferred correction iteration for the same accuracy requirement. The analyses are validated by preliminary numerical results. (Received February 09, 2009)