1131-65-384 **Mei Yang*** (mei.yang@mavs.uta.edu), 300 College Street. Apt.B, Arlington, TX 76010, and **Ren-Cang Li** (rcli@uta.edu), P.O. Box 19408, Department of Mathematics, University of Texas at Arlington, Arlington, TX 76019. *Heavy Ball Flexible GMRES Method for Linear System.*

GMRES method is one of Krylov subspace methods for nonsymmetric linear systems. There are many variants of GMRES method such as restarted GMRES, heavy ball GMRES (HBGMRES) and flexible GMRES (FGMRES). The heavy ball GMRES combines the restarted GMRES and the heavy ball method which is applied in optimization to accelerate the convergent speed. Inspired by HBGMRES, we present a heavy ball FGMRES method (HBFGMRES) not only to limit memory usage and control the orthogonalization cost, but also to cover up the slow convergence problem in restarted FGMRES. Numerical tests on real data are presented to demonstrate the superiority of the new methods restarted FGMRES. (Received July 18, 2017)