1116-65-330 **Hongtao Fan** and **Xinyun Zhu***, 5200 Arbor CT, Odessa, TX 79762. *A generalized relaxed positive-definite and skew-Hermitian splitting preconditioner for non-Hermitian saddle point problems.* Preliminary report.

For non-Hermitian saddle point problems with the non-Hermitian positive definite (1,1)-block, Zhang et al. (2014) presented a relaxed positive-definite and skew-Hermitian splitting (RPSS) preconditioner to accelerate the convergence rates of the Krylov subspace iteration methods such as GMRES. In this paper, the convergence property of the GRPSS iteration method is proved and a generalized RPSS (GRPSS) preconditioner is proposed. The GRPSS preconditioner is much closer to the coefficient matrix than the RPSS preconditioner in certain norm, which straightforwardly results in an GRPSS iteration method. We employ the GRPSS preconditioner to accelerate some Krylov subspace methods (like GMRES). The spectral distribution of the preconditioned matrix is described and an upper bound of the degree of the minimal polynomial of the preconditioned matrix is obtained. Finally, numerical experiments of a model Navier–Stokes equation are presented to illustrate the efficiency of the GRPSS preconditioner. (Received August 25, 2015)