1135-65-267 **Xinyun Zhu*** (zhu_x@utpb.edu), Xinyun Zhu, Department of Mathematics, UTPB, Odessa, TX 79762, and **Hongtao Fan** and **Bing Zheng**. *The generalized double shift-splitting preconditioner for nonsymmetric generalized saddle point problems from the steady Navier-Stokes equations.* Preliminary report.

In this paper, a generalized double shift-splitting (GDSS) preconditioner induced by a new matrix splitting method is proposed and implemented for nonsymmetric generalized saddle point problems having a nonsymmetric positive definite (1,1)-block and a positive definite (2,2)-block. Detailed theoretical analysis of the iteration matrix is provided to show the GDSS method, which corresponds to the GDSS preconditioner, is unconditionally convergent. Additionally, a deteriorated GDSS (DGDSS) method is proposed. It is shown that, with suitable choice of parameter matrix, the DGDSS preconditioned matrix has an eigenvalue at 1 with multiplicity n, and the other m eigenvalues are of the form $1 - \lambda$ with $|\lambda| < 1$, independently of the Schur complement matrix related. Finally, numerical experiments arising from a model Navier-Stokes problem are provided to validate and illustrate the effectiveness of the proposed preconditioner, with which a faster convergence for Krylov subspace iteration methods can be achieved. (Received August 16, 2017)