Li, Cui-Xia; Wu, Shi-Liang

**A single-step HSS method for non-Hermitian positive definite linear systems.**


Summary: In this paper, based on the Hermitian and skew-Hermitian splitting (HSS) iteration method, a single-step HSS (SHSS) iteration method is introduced to solve the non-Hermitian positive definite linear systems. Theoretical analysis shows that, under a loose restriction on the iteration parameter, the SHSS method is convergent to the unique solution of the linear system. Furthermore, we derive an upper bound for the spectral radius of the SHSS iteration matrix, and the quasi-optimal parameter is obtained to minimize the above upper bound. Numerical experiments are reported to the efficiency of the SHSS method; numerical comparisons show that the proposed SHSS method is superior to the HSS method under certain conditions.

**Keywords:** non-Hermitian matrix; matrix splitting; HSS method; convergence; Hermitian and skew-Hermitian splitting iteration method; single-step HSS iteration method; positive definite linear system; numerical experiment