

A NEW MINIMAL RESIDUAL METHOD FOR LARGE SCALE LYAPUNOV EQUATIONS

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Abstract

The solution of large scale algebraic Lyapunov equations is important in the stability analysis of linear dynamical systems. We present a projection-based residual minimizing procedure for solving the Lyapunov equation. As opposed to earlier methods (e.g., [I.M. Jiamoukha and E.M. Kasenally, SIAM J. Numer. Anal., 1994]), our algorithm relies on an inner iterative solver, accompanied with a selection of preconditioning techniques that effectively exploit the structure of the problem. The residual minimization allows us to relax the coefficient matrix passivity constraint, which is sometimes hard to meet in real application problems. Numerical experiments with standard benchmark problems will be reported.