

A Relaxation Strategy for Computing Low-Ranked Approximation Solution of Large-Scale Algebraic Riccati Equations

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In the last decade, large-scale computing has become an important research topic. Algebraic Riccati equations is a control problem comes from the quadratic optimization. In this talk, we use Newton-CFADI method for computing low-ranked approximation solution of large-scale algebraic Riccati equations. We have to apply alternating direction implicit iteration with Cholesky factor (CFADI) method to solve an induced stable large-scale Lyapunov equation in every Newton step. However, iterative methods usually oversolve the problem in the sense that they require for more ADI (inner) iterations than is required for the convergence of Newton (outer) iterations. We establish a practical strategy to reduce the inner iterations without affecting the convergence of the outer iterations. Furthermore, one may save total computation time almost half in our experiment compared with original method.