Department of Mathematics
The Inheritance of projection methods for algebraic Riccati equations

We are mainly concerned with inheritance properties of projection methods for solving large-scale algebraic Riccati equations (AREs), arising from the discretization process of some PDE control problems.

Techniques used in study

Discretization Techniques of PDEs
Linear Optimal Control Theory
Matrix Computation
Numerical Analysis

Our research achievements
- Some inheritance properties of Krylov-based methods have been addressed from the viewpoints of linear system control theory and perturbation theory, respectively.
- The unique solvability of the projected Riccati equations is inherited from the original AREs.
- Sharper residual bounds are derived for assessing the accuracy of the computed solutions of AREs.

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Publications
- L. Zhang, H.-Y. Fan and E. K.-W. Chu, Inheritance properties of Krylov subspace methods for continuous-time algebraic Riccati equations, *J. Comp. Appl. Math.*, 371 (2020), 112685.
- L. Zhang, H.-Y. Fan and E. K.-W. Chu, Krylov subspace methods for discrete-time algebraic Riccati equations, *Appl. Numer. Math.*, 152 (2020), pp. 499—510.