Some meaningful Hermitian solutions of anti-Riccati matrix equation arising in anti-LQR problem

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In this talk, we consider a class of conjugate discrete-time Riccati equations (CDARE), arising originally from the linear quadratic regulation problem for discrete-time antilinear systems. Recently, we have proven the existence of the maximal solution to the CDARE with a nonsingular control weighting matrix within the framework of a constructive method. Our contribution in the work is to find another meaningful Hermitian solution, which has received little attention in this field. Moreover, we show that certain extremal solutions cannot be simultaneously attained, and almost (anti-)stabilizing solutions coincide with some extremal solutions. We expected that our theoretical results presented in this work will play an important role in optimal control problems for discrete-time antilinear systems.