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Differential Riccati Equation - A Galerkin Approach

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We consider the differential Riccati equation,
$$= A^T X + XA - XBB^T X + C^T C.$$

The differential Riccati equation as well as the algebraic Riccati equation play important roles in applied mathematics like control theory and system theory. In our talk, we focus on the large-scale case. The numerical solution of these equation is challenging, in particular, because of the enormous amount of storage. A general approach, that has led to several algorithms, bases on an invariant subspace $Q \subseteq \mathbb{R}^{n \times n}$ such that $X(t) \in Q$ for all t. After identifying a suitable invariant subspace, we develop a Galerkin approach for the numerical solution of the differential Riccati equation. We review Davison-Maki methods for the numerical solution of the resulting equation.

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