ON THE SINGULAR VECTORS OF THE GENERALIZED LYAPUNOV OPERATOR

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Abstract. In this paper, we study the largest and the smallest singular vectors of the generalized Lyapunov operator. For real matrices $A, B$ with order $n$, we prove that $\max_{\|X\|_F=1} \|AXB^T + BXA^T\|_F$ is achieved by a symmetric matrix for $n \leq 3$ and give a counterexample for order $n = 4$. We also prove that $\min_{\|X\|_F=1} \|AXB^T + BXA^T\|_F$ is achieved by a symmetric matrix for $n \leq 2$ and give a counterexample for order $n = 3$. It is shown that the minimizer is symmetric, if the minimum is zero, or if the real parts of the eigenvalues of $A - \lambda B$ are of one sign.


Keywords and phrases: Singular vectors, generalized Lyapunov operator, separation.

REFERENCES


