

ALGORITHMS OF A CONTINUATION OF INVARIANT SUBSPACES

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Abstract

Let $s \in \mathbb{R}^1 \mapsto A(s) \in \mathbb{R}^{n \times n}$ be a family of matrices depending smoothly on s . The aim is to construct the corresponding family $s \in \mathbb{R}^1 \mapsto Z(s) \in \mathbb{R}^{n \times m}$ of invariant subspaces of $A(s)$, i.e., $A(s)Z(s) = Z(s)\Lambda(s)$, $\Lambda(s) \in \mathbb{R}^{m \times m}$. It is required that $Z(s)$ is spanned by the rightmost eigenvectors ξ which exceed a prescribed bound on $\operatorname{Re} \xi$. Therefore, m may vary with s .

In particular applications the above problem is related to the stability analysis of steady states of dynamical systems. Typically, $n \gg m$.

The approaches in current use will be considered and compared: a) Recursive Projection Method [4], b) solving direct defining equations via predictor-corrector [1], c) solving Riccati equation [4]. Modified algorithms will be proposed.

References

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