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Generic Families of Matrix pencils and their Bifurcation Diagrams

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ABSTRACT

In this article using miniversal deformations, we construct bifurcation diagrams for generic smooth zero-one- and two-parameter families of $m \times n$ complex matrices $A(\vec{\alpha}) + \lambda B(\vec{\alpha})$, where $\vec{\alpha} = (\alpha_1, \ldots, \alpha_k)$ are complex parameters, with respect simultaneous equivalence.

V.I. Arnold [1] constructed smooth generic families of matrices with respect to similarity transformations depending smoothly on the entries of matrices and got a such families with a small number of parameters.

We extend these results to pencils of matrices.

References

[1] V.I. Arnold, On matrices depending on parameters, Russian Math. Surveys 26 (n^o 2) (1971) 29-43.

[2] V.I. Arnold, Geometrical Methods in the Theory of Ordinary Differential Equations, Springer-Verlag, New York. 1988.

[3] A. Edelman, E. Elmroth and B. Kågström, A geometric approach to perturbation theory of matrices and matrix pencils. Part I: Versal Deformations, SIAM J. Matrix anal. Appl. 18 (n^o 3) (1997) 653-692.

[4] M.I. García-Planas, V. Sergeichuk, Simplest miniversal deformations of matrices, matrix pencils, and contragredient matrix pencils, L.A.A 302-303, (1999) 45-61.

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