

On continuous parameter dependence of roots of analytic functions

Manfred Möller

Considering pencils of ordinary differential operators with eigenvalue parameter dependent boundary conditions whose spectrum only consists of eigenvalues with finite multiplicity, the spectrum is given by the zeros of the characteristic function. Often, such a problem can be considered as a perturbation of a simpler problem, with corresponding perturbation of the characteristic functions. To the best of my knowledge, the global behaviour of the zeros have so far always been considered in an ad hoc way. I will present a general result on continuous dependence of the zeros of continuous families of analytic functions [2]. This is inspired by corresponding isomorphism results between the sets of polynomials and the (multi-)sets of their zeros; in particular, the topological approach used in [1].

References

- [1] Čurgus, B.; Mascioni, V., Roots and polynomials as homeomorphic spaces, *Expo. Math.* 24, No. 1, 81-95 (2006).
- [2] Möller, M., On continuous parameter dependence of roots of analytic functions, *Result. Math.* 79, issue 2, 9 pages, (2024), Url [10.1007/s00025-023-02079-y](https://doi.org/10.1007/s00025-023-02079-y).