

Zeros of entire functions: from René Descartes to Mark Krein and beyond

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The central question of many classical investigations, going back to Descartes, Newton, Euler, and others, is finding zeros of entire and meromorphic functions, given some standard representation of such a function, e.g., its coefficients in some standard basis. Specific questions of this type include zero localization with respect to a given curve (e.g., stability and hyperbolicity), behavior of zeros under special maps (e.g., differentiation, Hadamard product), and relations among roots of function families (e.g., orthogonal polynomials). The point of this talk is to give an overview of matrix and operator methods in this area, emphasizing old and new connections between algebra and analysis. The novel results in this talk are joint with M. Tyaglov.