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zero-free approximation

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Title: Zero free approximation.

Abstract. Let E be a compact subset of the complex plane with connected complement. We define $A(E)$ to be the class of all complex continuous functions on E that are holomorphic in the interior E^0 of E. The remarkable theorem of Mergelyan states that every $f \in A(E)$ is uniformly approximable by polynomials on E, but is it possible to realize such an approximation by polynomials that are zero-free on E? This question was proposed (but not pubished) by P. Gauthier and subsequently posed independently (and published) by J. Andersson. Recently, Arthur Danielyan described a class of functions for which zero-free approximation is possible on an arbitrary E. I intend to present a generalization of his work on Riemann surfaces. This is joint work with Paul Gauthier.