

On the convergence of rational Ritz values, with applications to rational interpolation of rational functions

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Abstract

We are interested in the question which poles of a (large degree) rational function with real poles and positive residuals (a Markov function) are well detected by a small degree rational interpolant, and how we can monitor by the choice of the real interpolation points such approximation properties, especially in the more delicate situation where interpolation points lie within the convex hull of the poles. Using classical orthogonality relations related to rational interpolation, we may rephrase this question as how well the zeros of a rational orthogonal function for a discrete scalar product approach the support of orthogonality. Initially, this question was motivated by the mathematically equivalent question of how well rational Ritz values approach the spectrum of a hermitian matrix [1].

In the present talk we suggest some asymptotic answer in terms of logarithmic potential theory, by generalizing work of Kuijlaars [2] (for Padé approximants at ∞ or polynomial Ritz values).

References

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http://math.univ-lille1.fr/bbecker/abstract/BB_SG_RV.pdf
- [2] A.B.J. Kuijlaars, Which eigenvalues are found by the Lanczos method?, SIAM Journal on Matrix Analysis and Applications, 22 (2000), pp. 306-321.