Bounding the Lebesgue constant for a barycentric rational trigonometric interpolant at periodic well-spaced nodes. (English) [Zbl 07376397]

Summary: A well-known result in linear approximation theory states that the norm of the operator, known as the Lebesgue constant, of polynomial interpolation on an interval grows only logarithmically with the number of nodes, when these are Chebyshev points. Results like this are important for studying the conditioning of the approximation. A cosine change of variable shows that polynomial interpolation at Chebyshev points is just the special case for even functions of trigonometric interpolation (on the circle) at equidistant points. The Lebesgue constant of the latter grows logarithmically, also for functions with no particular symmetry. In the present work, we show that a linear rational generalization of the trigonometric interpolant enjoys a logarithmically growing Lebesgue constant for more general sets of nodes, namely periodic well-spaced ones, patterned after those introduced for an interval by L. Bos et al. [J. Approx. Theory 169, 7–22 (2013; Zbl 1281.41001)]. An important special case are conformally shifted equispaced points, for which the rational trigonometric interpolant is known to converge exponentially.

MSC:
42A15 Trigonometric interpolation
41A05 Interpolation in approximation theory
65T40 Numerical methods for trigonometric approximation and interpolation
65D05 Numerical interpolation

Keywords:
barycentric rational interpolation; trigonometric interpolation; Lebesgue constant; conformal maps

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References:


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