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Asymptotically sharp bounds in the Hardy-Littlewood inequalities on mean values of analytic functions

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Abstract

Let f be analytic in the unit disc, and let it belong to the Hardy space H p, equipped with the usual norm ‖f‖ p. It is known from the work of Hardy and Littlewood that for $q > p$, the constants C (p,q) :=sup{∫ 1 0(1 - r) -p/q(1/2π ∫ 2π 0 |f(re iθ)| qdθ) p/qdr|‖f‖ p = 1}, with the usual extension to the case where $q = \infty$, have $C(p,q) < \infty$. The authors prove that lim q→p(- p/q)C(p,q) = 1, inf p