Karlstad Applied Analysis Seminar (2021)

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The infinite Hilbert matrix on spaces of analytic functions

Abstract

The finite Hilbert matrix is arguably one of the single most well-known matrices in mathematics. The infinite Hilbert matrix was introduced by David Hilbert around 120 years ago in connection to his double series theorem. It can be interpreted as a linear operator on spaces of analytic functions by its action on their Taylor coefficients. The boundedness of the infinite Hilbert matrix on the Hardy spaces Hp for p ¿ 1 and Bergman spaces Ap for p ¿ 2 was established by Diamantopoulos and Siskakis. The exact value of the operator norm of the Hilbert matrix acting on the Bergman spaces Ap for p ¿= 4 was shown to be "pi/sin(2pi/p)" by Dostanic, Jevtic and Vukotic in 2008. The case 2 ¡ p ¡ 4 was an open problem until in 2018 it was shown by Bozin and Karapetrovic that the norm has the same value also on the scale 2 ¡ p ¡ 4. In this talk, we review some of the old results and consider the still partly open problem regarding the value of the norm on weighted Bergman spaces. The talk is partly based on a joint work with Mikael Lindström and Niklas Wikman (Åbo Akademi).