Hilbert matrix on mixed norm spaces

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We prove that the Hilbert matrix operator H is bounded on the mixed norm space $H_\nu^{p,q,\alpha}$ if and only if $0 < \kappa_{p,\alpha,\nu} < 1$, where $\kappa_{p,\alpha,\nu} = \nu - \alpha - \frac{1}{p} + 1$. In particular, Hilbert matrix operator H is bounded on the weighted Bergman space $A^{p,\alpha}$ if and only if $1 < \alpha + 2 < p$ and it is bounded on the Dirichlet space $\mathcal{D}_\alpha^p$ if and only if $\max\{-1, p-2\} < \alpha < 2p - 2$. Also, it is well known that the norm of the Hilbert matrix operator H on the Bergman space A^p is equal to $\frac{\pi}{\sin\frac{2\pi}{p}}$, when $4 \leq p < \infty$, and it was also conjectured that

$$\|H\|_{A^p \to A^p} = \frac{\pi}{\sin\frac{2\pi}{p}},$$

when $2 < p < 4$. Following [1] we prove this conjecture.

References

[1] V. Božin and B. Karapetrović, Norm of the Hilbert matrix on Bergman spaces, J. Funct. Anal. **274** (2018), 525–543.

[2] M. Jevtić and B. Karapetrović, Hilbert matrix on spaces of Bergman-type, J. Math. Anal. Appl. **453** (2017), 241–254.

[3] B. Karapetrović, Norm of the Hilbert matrix operator on the weighted Bergman spaces, Glasg. Math. J. (to appear).