

## Norm of the Hilbert matrix operator on positively indexed weighted Bergman spaces

Dušica Dmitrović

*University of Belgrade, Faculty of Mathematics, Studentski trg 16, Belgrade, Serbia*  
*e-mail: dusica.dmitrovic@matf.bg.ac.rs*

Boban Karapetrović

*University of Belgrade, Faculty of Mathematics, Studentski trg 16, Belgrade, Serbia*  
*e-mail: boban.karapetrovic@matf.bg.ac.rs*

**Abstract.** It is known [2] that the Hilbert matrix is bounded on weighted Bergman spaces  $A_\alpha^p$  if and only if  $1 < \alpha + 2 < p$  with the conjectured norm  $\pi / \sin \frac{(\alpha+2)\pi}{p}$ . In the case of positively indexed weighted Bergman spaces, when  $\alpha > 0$ , the conjecture is confirmed [4] for  $\alpha_0 \leq p$ , where  $\alpha_0$  is a unique zero of the function  $\Phi_\alpha(x) = 2x^2 - (4(\alpha + 2) + 1)x + 2\sqrt{\alpha + 2}\sqrt{x} + \alpha + 2$  on the interval  $(\alpha + 2, 2(\alpha + 2))$ . We prove, that if  $\alpha > 0$ , then the conjecture is valid for all

$$\frac{3\alpha}{4} + 2 + \sqrt{\left(\frac{3\alpha}{4} + 2\right)^2 - \frac{\alpha + 2}{2}} \leq p.$$

This considerably improves the best previously known result for all  $\alpha > \frac{1}{2}$ .

**Keywords:** Hilbert matrix, operator norm, weighted Bergman spaces.

### References

- [1] **D. Dmitrović, B. Karapetrović.** On the Hilbert matrix norm on positively indexed weighted Bergman spaces. *Revista de la Real Academia de Ciencias Exactas, Físicas y Naturales. Serie A. Matemáticas*, 2023, 117, 1-12.
- [2] **M. Jevtić, B. Karapetrović.** Hilbert matrix on spaces of Bergman-type. *Journal of Mathematical Analysis and Applications*, 2017, 453, 241–254.
- [3] **B. Karapetrović.** Norm of the Hilbert matrix operator on the weighted Bergman spaces *Glasgow Mathematical Journal*, 2018, 60, 513–525.
- [4] **B. Karapetrović.** Hilbert Matrix and Its Norm on Weighted Bergman Spaces. *Journal of Geometric Analysis*, 2021, 31, 5909–5940.