

## ON A MORE ACCURATE MULTIDIMENSIONAL HILBERT-TYPE INEQUALITY WITH PARAMETERS

BICHENG YANG

*Abstract.* In this paper, by using the way of weight coefficients and technique of real analysis and complex analysis, a more accurate multidimensional discrete Hilbert-type inequality with a best possible constant factor and some parameters is given. The equivalent form, the operator expression with the norm are also considered.

*Mathematics subject classification* (2010): 26D15, 47A07.

*Keywords and phrases:* Hilbert-type inequality, weight coefficient, equivalent form, operator, norm.

### REFERENCES

- [1] G. H. HARDY, J. E. LITTLEWOOD, G. PÓLYA, *Inequalities*, Cambridge University Press, Cambridge, 1934.
- [2] D. S. MITRINOVIĆ, J. E. PEČARIĆ, A. M. FINK, *Inequalities involving functions and their integrals and derivatives*, Kluwer Academic Publishers, Boston, 1991.
- [3] B. YANG, *Hilbert-type integral inequalities*, Bentham Science Publishers Ltd., Dubai, 2009.
- [4] B. YANG, *Discrete Hilbert-type inequalities*, Bentham Science Publishers Ltd., Dubai, 2011.
- [5] B. YANG, *On Hilbert's integral inequality*, Journal of Mathematical Analysis and Applications, **220** (1998), 778–785.
- [6] B. YANG, *The norm of operator and Hilbert-type inequalities*, Science Press, Beijing, 2009 (China).
- [7] B. YANG, *Two types of multiple half-discrete Hilbert-type inequalities*, Lambert Academic Publishing, Berlin, 2012.
- [8] B. YANG, I. BRNETIĆ, M. KRNIĆ, J. E. PEČARIĆ, *Generalization of Hilbert and Hardy-Hilbert integral inequalities*, Math. Ineq. and Appl., **8**, 2 (2005), 259–272.
- [9] M. KRNIĆ, J. E. PEČARIĆ, *Hilbert's inequalities and their reverses*, Publ. Math. Debrecen, **67**, 3–4 (2005), 315–331.
- [10] B. YANG, TH. M. RASSIAS, *On the way of weight coefficient and research for Hilbert-type inequalities*, Math. Ineq. Appl., **6**, 4 (2003), 625–658.
- [11] B. YANG, TH. M. RASSIAS, *On a Hilbert-type integral inequality in the subinterval and its operator expression*, Banach J. Math. Anal., **4**, 2 (2010), 100–110.
- [12] L. AZAR, *On some extensions of Hardy-Hilbert's inequality and Applications*, Journal of Inequalities and Applications, **2009**, no. 546829.
- [13] B. ARPAD, O. HOONGHONG, *Best constant for certain multi linear integral operator*, Journal of Inequalities and Applications, **2006**, no. 28582.
- [14] J. KUANG, L. DEBNATH, *On Hilbert's type inequalities on the weighted Orlicz spaces*, Pacific J. Appl. Math., **1**, 1 (2007), 95–103.
- [15] W. ZHONG, *The Hilbert-type integral inequality with a homogeneous kernel of Lambda-degree*, Journal of Inequalities and Applications, **2008**, no. 917392.
- [16] Y. HONG, *On Hardy-Hilbert integral inequalities with some parameters*, J. Ineq. in Pure & Applied Math., **6**, 4 (2005) Art. 92, 1–10.
- [17] W. ZHONG, B. YANG, *On multiple Hardy-Hilbert's integral inequality with kernel*, Journal of Inequalities and Applications, Vol. **2007**, Art. ID 27962, 17 pages, doi: 10.1155/2007/27.
- [18] B. YANG, M. KRNIĆ, *On the Norm of a Mult-dimensional Hilbert-type Operator*, Sarajevo Journal of Mathematics, **7**, 20 (2011), 223–243.

- [19] M. KRNIĆ, J. E. PEČARIĆ, P. VUKOVIĆ, *On some higher-dimensional Hilbert's and Hardy-Hilbert's type integral inequalities with parameters*, *Math. Inequal. Appl.*, **11** (2008), 701–716.
- [20] M. KRNIĆ, P. VUKOVIĆ, *On a multidimensional version of the Hilbert-type inequality*, *Analysis Mathematica*, **38** (2012), 291–303.
- [21] M. TH. RASSIAS, B. YANG, *A multidimensional half-discrete Hilbert-type inequality and the Riemann zeta function*, *Applied Mathematics and Computation*, **225** (2013), 263–277.
- [22] Y. LI, B. HE, *On inequalities of Hilbert's type*, *Bulletin of the Australian Mathematical Society*, **76**, 1 (2007), 1–13.
- [23] B. YANG, *A mixed Hilbert-type inequality with a best constant factor*, *International Journal of Pure and Applied Mathematics*, **20**, 3 (2005), 319–328.
- [24] B. YANG, *A half-discrete Hilbert-type inequality*, *Journal of Guangdong University of Education*, **31**, 3 (2011), 1–7.
- [25] W. ZHONG, *A mixed Hilbert-type inequality and its equivalent forms*, *Journal of Guangdong University of Education*, **31**, 5 (2011), 18–22.
- [26] W. ZHONG, *A half discrete Hilbert-type inequality and its equivalent forms*, *Journal of Guangdong University of Education*, **32**, 5 (2012), 8–12.
- [27] J. ZHONG, B. YANG, *On an extension of a more accurate Hilbert-type inequality*, *Journal of Zhejiang University (Science Edition)*, **35**, 2 (2008), 121–124.
- [28] J. ZHONG, *Two classes of half-discrete reverse Hilbert-type inequalities with a non-homogeneous kernel*, *Journal of Guangdong University of Education*, **32**, 5 (2012), 11–20.
- [29] W. ZHONG, B. YANG, *A best extension of Hilbert inequality involving several parameters*, *Journal of Jinan University (Natural Science)*, **28**, 1 (2007), 20–23.
- [30] W. ZHONG, B. YANG, *A reverse Hilbert's type integral inequality with some parameters and the equivalent forms*, *Pure and Applied Mathematics*, **24**, 2 (2008), 401–407.
- [31] M. TH. RASSIAS, B. YANG, *On half-discrete Hilbert's inequality*, *Applied Mathematics and Computation*, **220** (2013), 75–93.
- [32] W. ZHONG, B. YANG, *On multiple Hardy-Hilbert's integral inequality with kernel*, *Journal of Inequalities and Applications*, Vol. **2007**, Art. ID 27962, 17 pages, doi: 10.1155/2007/27.
- [33] B. YANG, Q. CHEN, *A half-discrete Hilbert-type inequality with a homogeneous kernel and an extension*, *Journal of Inequalities and Applications*, **124** (2011), doi:10.1186/1029-242X-2011-124.
- [34] B. YANG, *A half-discrete Hilbert-type inequality with a non-homogeneous kernel and two variables*, *Mediterranean Journal of Mathematics*, **10** (2013), 677–692.
- [35] B. YANG, *Hilbert-type integral operators: norms and inequalities* (In Chapter 42 of “Nonlinear Analysis, stability, approximation, and inequalities” (P. M. Paralos et al.)), Springer, New York, 771–859, 2012.
- [36] Y. PAN, H. WANG, F. WANG, *On complex functions*, Science Press, Beijing, 2006 (China).
- [37] J. KUANG, *Applied inequalities*, Shangdong Science Technic Press, Jinan, 2004 (China).