Mathematical
Inequalities
& Applications
Volume 23, Number 1 (2020), 231–244
doi:10.7153/mia-2020-23-18

EQUIVALENT STATEMENTS OF A MORE ACCURATE EXTENDED MULHOLLAND'S INEQUALITY WITH A BEST POSSIBLE CONSTANT FACTOR

BICHENG YANG, MEIFA HUANG AND YANRU ZHONG

Abstract. By the use of the weight functions, the idea of introduced parameters and Hermite-Hadamard's inequality, a more accurate extended Mulholland's inequality and its equivalent form are given. A few equivalent statements of the best possible constant factor related to some parameters, some particular cases and the operator expressions are considered.

Mathematics subject classification (2010): 26D15.
Keywords and phrases: Weight function, Mulholland's inequality, equivalent statement, Hermite-Hadamard's inequality, operator expression.

REFERENCES

[1] G. H. HARDY, J. E. LITTLEWOOD, G. PÓLYA, *Inequalities*, Cambridge University Press, Cambridge, 1934.
[2] B. C. YANG, *The norm of operator and Hilbert-type inequalities*, Science Press, Beijing, China, 2009.
[3] B. C. YANG, *Hilbert-Type Integral Inequalities*, Bentham Science Publishers Ltd., The United Arab Emirates, 2009.
[4] B. HE, *A multiple Hilbert-type discrete inequality with a new kernel and best possible constant factor*, Journal of Mathematical Analysis and Applications, **431**(2015), 990–902.
[5] J. S. XU, *Hardy-Hilbert's inequalities with two parameters*, Advances in Mathematics, **36**(2)(2007), 63–76.
[6] Q. L. HUANG, *A new extension of Hardy-Hilbert-type inequality*, Journal of Inequalities and Applications (2015), 2015:397.
[7] Z. T. XIE, Z. ZENG, Y. F. SUN, *A new Hilbert-type inequality with the homogeneous kernel of degree -2*, Advances and Applications in Mathematical Sciences, **12**(7)(2013), 391–401.
[8] Z. ZENG, K. RAJA RAMA GANDHI, Z. T. XIE, *A new Hilbert-type inequality with the homogeneous kernel of degree -2 and with the integral*, Bulletin of Mathematical Sciences and Applications, **3**(1)(2014), 11–20.
[9] D. M. XIN, *A Hilbert-type integral inequality with the homogeneous kernel of zero degree*, Mathematical Theory and Applications, **30**(2)(2010), 70–74.
[10] L. E. AZAR, *The connection between Hilbert and Hardy inequalities*, Journal of Inequalities and Applications, 2013:452, 2013.
[11] B. C. YANG, Q. CHEN, *A more accurate multidimensional Hardy-Mulholland-type inequality with a general homogeneous kernel*, Journal of Mathematical Inequalities, **12**(1)(2018), 113–128.
[12] M. TH. RASSIAS, B. C. YANG, *On an equivalent property of a reverse Hilbert-type integral inequality related to the extended Hurwitz-zeta function*, Journal of Mathematics Inequalities, **13**(2)(2019), 315–334.
[13] V. ADIYASUREN, T. BATBOLD, M. KRNIĆ, *Hilbert-type inequalities involving differential operators, the best constants and applications*, Math. Inequal. Appl., **18**(1)(2015), 111–124.
[14] M. KRNIĆ, M. Z. GAO, J. PEČARIĆ, X. M. GAO, *On the best constant in Hilbert's inequality*, Math. Inequal. Appl. **8**(2)(2005), 317–329.
[15] M. KRNIĆ, J. PEČARIĆ, *Extension of Hilbert's inequality*, J. Math. Anal. Appl., **324**(2006), 150–160.

Paper MIA-23-18

[16] M. KRNIĆ, *A refined discrete Hilbert inequality via the Hermite-Hadamard inequality*, Comput. Math. Appl, **63** (2012), 1587–1596.
[17] M. TH. RASSIAS, B. C. YANG, *On half-discrete Hilbert's inequality*, Applied Mathematics and Computation, **220**(2013), 75–93.
[18] B. C. YANG, M. KRNIĆ, *A half-discrete Hilbert-type inequality with a general homogeneous kernel of degree 0*, Journal of Mathematical Inequalities, **6**(3)(2012), 401–417.
[19] M. TH. RASSIAS, B. C. YANG, *A multidimensional half–discrete Hilbert-type inequality and the Riemann zeta function*, Applied Mathematics and Computation, **225** (2013), 263–277.
[20] M. TH. RASSIAS, B. C. YANG, *On a multidimensional half-discrete Hilbert-type inequality related to the hyperbolic cotangent function*, Applied Mathematics and Computation, **242**(2013), 800–813.
[21] Z. X. HUANG, B. C. YANG, *On a half-discrete Hilbert-type inequality similar to Mulholland's inequality*, Journal of Inequalities and Applications, 2013:290, 2013.
[22] B. C. YANG, L. DEBNATH, *Half-Discrete Hilbert-Type Inequalities*, World Scientific Publishing, Singapore, 2014.
[23] Y. HONG, Y. WEN, *A necessary and Sufficient condition of that Hilbert type series inequality with homogeneous kernel has the best constant factor*, Annals Mathematica, **37A**(3)(2016), 329–336.
[24] Y. HONG, *On the structure character of Hilbert's type integral inequality with homogeneous kernel and applications*, Journal of Jilin University (Science Edition), **55**(2)(2017), 189–194.
[25] Y. HONG, Q. L. HUANG, B. C. YANG, J. L. LIAO, *The necessary and sufficient conditions for the existence of a kind of Hilbert-type multiple integral inequality with the non-homogeneous kernel and its applications*, Journal of Inequalities and Applications (2017), 2017:316.
[26] D. M. XIN, B. C. YANG, A. Z. WANG, *Equivalent property of a Hilbert-type integral inequality related to the beta function in the whole plane*, Journal of Function Spaces, Volume 2018, Article ID2691816, 8 pages.
[27] Y. HONG, B. HE, B. C. YANG, *Necessary and Sufficient Conditions for the Validity of Hilbert Type Integral Inequalities with a Class of Quasi-Homogeneous Kernels and Its Application in Operator Theory*, Journal of Mathematics Inequalities, **12**(3)(2018), 777–788.
[28] J. C. KUANG, *Applied inequalities*, Shangdong Science and Technology Press, Jinan, China, 2004.