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## WIRTINGER TYPE INEQUALITIES FOR CONFORMABLE FRACTIONAL INTEGRALS

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**Abstract.** The aim of this paper is to establish a generalization and a refinement of Wirtinger's inequality for conformable fractional integrals.

MSC 2010. 26D15, 26A51, 26A33, 26A42.

**Key words.** Conformable fractional integrals, Hölder's inequality, Wirtinger inequality.

## REFERENCES

- T. Abdeljawad, On conformable fractional calculus, J. Comput. Appl. Math., 279 (2015) 57–66.
- [2] E.F. Beckenbach and R. Bellman, *Inequalities*, Springer-Verlag, Berlin, 1983.
- [3] D.R. Anderson, Taylor's formula and integral inequalities for conformable fractional derivatives, in Contributions in Mathematics and Engineering. In Honor of Constantin Carathéodory, Springer, 2016.
- [4] P.R. Beesack, Integral inequalities involving a function and its derivative, Amer. Math. Monthly, 78 (1971), 705–741.
- [5] D.S. Mitrinović, J.E. Pecarić and A.M. Fink, Inequalities involving functions and their integrals and derivatives, Springer, Dordrecht, 1991.
- [6] M.A. Hammad and R. Khalil, Conformable fractional heat differential equations, International Journal of Pure and Applied Mathematics, 94 (2014), 215–221.
- M.A. Hammad and R. Khalil, Abel's formula and wronskian for conformable fractional differential equations, International Journal of Differential Equations and Applications, 13 (2014), 177–183.
- [8] O.S. Iyiola and E.R.Nwaeze, Some new results on the new conformable fractional calculus with application using D'Alambert approach, Progress in Fractional Differentiation and Applications, 2 (2016), 115–122.
- [9] R. Khalil, M. Al horani, A. Yousef and M. Sababheh, A new definition of fractional derivative, J. Comput. Appl. Math., 264 (2014), 65–70.
- [10] P.R. Beesack, Integral inequalities of the Wirtinger type, Duke Math. J., 25 (1958), 477–498.
- [11] C.A. Swanson, Wirtinger's inequality, SIAM J. Math. Anal., 9 (1978), 484–491.
- [12] J. Jaroš, On an integral inequality of the Wirtinger type, Appl. Math. Lett., 24 (2011), 1389–1392.
- [13] C.F. Lee, C.C. Yeh, C.H. Hong and R.P. Agarwal, Lyapunov and Wirtinger inequalities, Appl. Math. Lett., 17 (2004), 847–853.
- [14] S.-E. Takahasi and T. Miura, A note on Wirtinger-Beesack's integral inequalities, Math. Inequal. Appl., 6 (2003), 277–282.

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