

BOUNDS OF NUMERICAL RADIUS OF BOUNDED LINEAR OPERATORS USING t -ALUTHGE TRANSFORM

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Abstract. We develop a number of inequalities to obtain bounds for the numerical radius of a bounded linear operator defined on a complex Hilbert space using the properties of t -Aluthge transform. We show that the bounds obtained are sharper than the existing bounds.

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REFERENCES

- [1] A. ABU-OMAR AND F. KITTANEH, *A numerical radius inequality involving the generalized Aluthge transform*, Studia Math. 216(1) (2013) 69–75.
- [2] P. BHUNIA, S. BAG AND K. PAUL, *Numerical radius inequalities and its applications in estimation of zeros of polynomials*, Linear Algebra Appl. 573 (2019) 166–177.
- [3] F. CHABBABI AND M. MBEKHTA, *New formulas for the spectral radius via λ -Aluthge transform*, Linear Algebra Appl. 515 (2017) 246–254.
- [4] H.-L. GAU, AND P.Y. WU, *Equality of three numerical radius inequalities*, Linear Algebra Appl. 554 (2018) 51–67.
- [5] E. HEINZ, *Beiträge zur Störungstheorie der Spektralzerlegung*, Math. Ann. 123 (1951) 415–438.
- [6] I.B. JUNG, E. KO AND C. PEARCY, *Aluthge transforms of operators*, Integral Equations Operator Theory 37 (2000) 437–448.
- [7] F. KITTANEH, *Numerical radius inequalities for Hilbert spaces operators*, Studia Math. 168(1) (2005) 73–80.
- [8] F. KITTANEH, *Numerical radius inequality and an estimate for the numerical radius of the Frobenius companion matrix*, Studia Math. 158(1) (2003) 11–17.
- [9] F. KITTANEH, *Commutator inequalities associated with the polar decomposition*, Proc. Amer. Math. Soc. 130 (2002) 1279–1283.
- [10] K. OKUBO, *On weakly unitarily invariant norm and the Aluthge transformation*, Linear Algebra Appl. 371 (2003) 369–375.
- [11] K. PAUL AND S. BAG, *On the numerical radius of a matrix and estimation of bounds for zeros of a polynomial*, Int. J. Math. Math. Sci. 2012 (2012) Article Id 129132, <https://doi.org/10.1155/2012/129132>.
- [12] T. YAMAZAKI, *On upper and lower bounds for the numerical radius and an equality condition*, Studia Math. 178(1) (2007) 83–89.
- [13] X. ZHOU, J. FANG AND S. WEN, *A note on the C -numerical radius and the λ -Aluthge transform in finite factors*, Ann. Funct. Anal. 9(4) (2018) 463–473.