

GENERALIZATION OF SOME UNITARILY INVARIANT NORM INEQUALITIES FOR MATRICES

AHMAD AL-NATOOR, MOHAMMAD A. AMLEH, BAHA' ABUGHAZALEH
AND ALIAA BURQAN

Abstract. In this paper, we prove new unitarily invariant norm inequalities for positive semidefinite matrices. Some of these inequalities represents a generalization of earlier work due to Kittaneh who refines an inequality due to Davidson and Power which is useful in best approximation of C^* -algebras.

Mathematics subject classification (2020): 15A18, 15A42, 15A60, 15B57, 47B30.

Keywords and phrases: Spectral norm, unitarily invariant norm, positive semidefinite matrix, inequality.

REFERENCES

- [1] A. AL-NATOOR, S. BENZAMIA AND F. KITTANEH, *Unitarily invariant norm inequalities for positive semidefinite matrices*, Linear Algebra Appl. 633 (2022), 303–315.
- [2] A. AL-NATOOR, O. HIRZALLAH AND F. KITTANEH, *Interpolating inequalities for functions of positive semidefinite matrices*, Banach J. Math. Anal. 12 (2018), 955–969.
- [3] A. AL-NATOOR, O. HIRZALLAH AND F. KITTANEH, *Singular value inequalities for convex functions of positive semidefinite matrices*, Ann. Funct. Anal. 14 (2023), Paper No. 7, 14 pp.
- [4] A. AL-NATOOR, O. HIRZALLAH AND F. KITTANEH, *Singular value inequalities for product and sums of matrices*, preprint.
- [5] A. AL-NATOOR AND F. KITTANEH, *Singular value and norm inequalities for positive semidefinite matrices*, Linear Multilinear Algebra, <https://doi.org/10.1080/03081087.2021.1882373>.
- [6] A. AL-NATOOR AND F. KITTANEH, *Further unitarily invariant norm inequalities for positive semidefinite matrices*, Positivity, 26 (2022), Paper No. 8, 11 pp.
- [7] R. BHATIA, *Matrix Analysis*, Springer-Verlag, New York, 1997.
- [8] R. BHATIA AND F. KITTANEH, *On the singular values of a product of operators*, SIAM J. Matrix Anal. Appl. 11 (1990), 272–277.
- [9] A. BURQAN AND F. KITTANEH, *Singular value and norm Inequalities associated with 2×2 positive semidefinite block matrices*, The Electronic Journal of Linear Algebra, 32 (2017), 116–124.
- [10] K. DAVIDSON AND S. C. POWER, *Best approximation in C^* -algebras*, J. Reine Angew. Math. 368 (1986), 43–62.
- [11] J. C. HOU, H. K. DU, *Norm inequalities of positive operator matrices*, Integral Equations Operator Theory 22 (1995), 281–294.
- [12] F. KITTANEH, *Norm inequalities for certain operator sums*, J Funct Anal. 1997; 143: 337–348.
- [13] F. KITTANEH, *Norm inequalities for sums of positive operators*, J. Operator Theory 48 (2002), 95–103.
- [14] Y. TAO, *More results on singular value inequalities of matrices*, Linear Algebra Appl. 416 (2006) 724–729.