

HOW TO COMPARE THE ABSOLUTE VALUES OF OPERATOR SUMS AND THE SUMS OF ABSOLUTE VALUES?

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Abstract. We address the problem of comparing $|A+B|$ and $|A|+|B|$, for $A, B \in \mathbb{M}_n(\mathbb{C})$. Some results are obtained by using a technique of positive linear maps and several open questions are proposed.

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REFERENCES

- [1] K. AUDENAERT, *Variance bounds with an application to norm bounds for commutators*, Linear Algebra Appl. **432** (2010), 1126–1143.
- [2] R. BHATIA, *Matrix Analysis*, Springer, 1997, New-York.
- [3] R. BHATIA, *Positive definite matrices*, Princeton University Press.
- [4] A. BÖTTCHER AND D. WENZEL, *How big can the commutator of two matrices be and how big is it typically?*, Linear Algebra Appl. **403** (2005), 216–218.
- [5] A. BÖTTCHER AND D. WENZEL, *The Frobenius norm and the commutator*, Linear Algebra Appl. **429** (2008), 1864–1885.
- [6] J.-C. BOURIN, *Symmetric norms and reverse inequalities to Davis and Hansen-Pedersen characterizations of operator convexity*, Math. Inequal. Appl. **9**, 1 (2006), 33–42.
- [7] J.-C. BOURIN, *A matrix subadditivity inequality for symmetric norms*, Proc. Amer. Math. Soc. **138** (2010), 495–504.
- [8] J.-C. BOURIN AND E. RICARD, *An asymmetric Kadison’s inequality*, Linear Alg. Appl. **433** (2010), 499–510.
- [9] J.-C. BOURIN AND M. UCHIYAMA, *A matrix subadditivity inequality for $f(A+B)$ and $f(A)+f(B)$* , Linear Alg. Appl. **423** (2007), 512–518.
- [10] E.-Y. LEE, *A matrix reverse Cauchy-Schwarz inequality*, Linear Alg. Appl. **430** (2009), 805–810.
- [11] E.-Y. LEE, *Rotfel’d type inequalities for norms*, Linear Algebra Appl. **433** (2010), 580–584.
- [12] R.C. THOMPSON, *Convex and concave functions of singular values of matrix sums*, Pacific J. Math. **66** (1976), 285–290.