

## REVERSES OF YOUNG TYPE INEQUALITIES

ALIAA BURQAN AND MONA KHANDAQJI

*Abstract.* This paper aims to give reverses of Young type inequalities which were established by Kai [4]. Then we use these inequalities to establish corresponding inequalities for matrices. Also we present a refinement of the trace version of Young's inequality.

*Mathematics subject classification (2010):* 15A45, 15A60.

*Keywords and phrases:* Unitarily invariant norms, Young inequality, positive matrices, singular values.

### REFERENCES

- [1] T. ANDO, *Matrix Young Inequalities*, Oper. Theory Adv. Appl. **75** (1995), 33–38.
- [2] R. BHATIA, *Matrix Analysis*, Springer-Verlag, New York, 1997.
- [3] D. CARTWRIGHT AND M. FIELD, *A refinement of the arithmetic mean-geometric mean inequality*, Proc. Amer. Math. Soc. **71** (1978), 36–38.
- [4] H. KAI, *Young type inequalities for matrices*, Journal of East China Normal University **4** (2012), 12–17.
- [5] F. KITTANEH AND Y. MANASRAH, *Improved Young and Heinz inequalities for matrices*, J. Math. Anal. Appl. **361** (2010), 262–269.
- [6] F. KITTANEH AND Y. MANASRAH, *Reverse Young and Heinz inequalities for matrices*, Linear and Multilinear Algebra **59** (2011), 1031–1037.