

## A REMARK ON EXTENSION OF ORDER PRESERVING OPERATOR INEQUALITY

TATSUYA KOIZUMI AND KEIICHI WATANABE

*Abstract.* We will give an extension of order preserving operator inequality of Furuta type.

*Mathematics subject classification (2010):* 47A63.

*Keywords and phrases:* Löwner-Heinz inequality, Furuta inequality, order preserving operator inequality.

### REFERENCES

- [1] T. ANDO AND F. HIAI, *Log majorization and complementary Golden-Thompson type inequalities*, Linear Algebra Appl. **197/198** (1994), 113–131.
- [2] T. FURUTA,  $A \geq B \geq 0$  assures  $(B^r A^p B^r)^{1/q} \geq B^{(p+2r)/q}$  for  $r \geq 0$ ,  $p \geq 0$ ,  $q \geq 1$  with  $(1+2r)q \geq p+2r$ , Proc. Amer. Math. Soc. **101**, 1 (1987), 85–88.
- [3] T. FURUTA, *Extension of the Furuta inequality and Ando-Hiai log-majorization*, Linear Algebra Appl. **219** (1995), 139–155.
- [4] T. FURUTA, *Invitation to linear operators*, Taylor & Francis, London, 2001.
- [5] T. FURUTA, *A proof of an order preserving inequality*, Proc. Japan Acad. Ser. A Math. Sci. **78**, 2 (2002), 26.
- [6] T. FURUTA, *Further extension of an order preserving operator inequality*, J. Math. Inequal. **2**, 4 (2008), 465–472.
- [7] T. FURUTA, *Log majorization via an order preserving operator inequality*, Linear Algebra Appl. **431**, 1–2 (2009), 132–138.
- [8] T. FURUTA, *Operator function associated with an order preserving operator inequality*, J. Math. Inequal. **3**, 1 (2009), 21–29.
- [9] T. FURUTA, *An extension of order preserving operator inequality*, Math. Inequal. Appl. **13**, 1 (2010), 49–56.
- [10] E. HEINZ, *Beiträge zur Störungstheorie der Spektralzerlegung*, Math. Ann. **124** (1951), 415–438.
- [11] K. LÖWNER, *Über monotone Matrixfunktionen*, Math. Z. **38** (1934), 177–216.
- [12] M. UCHIYAMA, *Criteria for monotonicity of operator means*, J. Math. Soc. Japan **55**, 1 (2003), 197–207.
- [13] C. YANG AND Y. WANG, *Further extension of Furuta inequality*, J. Math. Inequal. **4**, 3 (2010), 391–398.