

LINEAR PRESERVERS OF TWO-SIDED RIGHT MATRIX MAJORIZATION ON \mathbb{R}_n

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ABSTRACT. A nonnegative real matrix $R \in \mathbf{M}_{n,m}$ with the property that all its row sums are one is said to be row stochastic. For $x, y \in \mathbb{R}_n$, we say x is right matrix majorized by y (denoted by $x \prec_r y$) if there exists an n -by- n row stochastic matrix R such that $x = yR$. The relation \sim_r on \mathbb{R}_n is defined as follows. $x \sim_r y$ if and only if $x \prec_r y \prec_r x$. In the present paper, we characterize the linear preservers of \sim_r on \mathbb{R}_n , and answer the question raised by F. Khalooei [Wavelet Linear Algebra **1** (2014), no. 1, 43–50].

REFERENCES

1. T. Ando, *Majorization, doubly stochastic matrices, and comparison of eigenvalues*, Linear Algebra Appl. **118** (1989), 163–248.
2. H. Chiang and C.-K. Li, *Generalized doubly stochastic matrices and linear preservers*, Linear Multilinear Algebra **53** (2005), 1–11.
3. A. M. Hasani and M. Radjabalipour, *The structure of linear operators strongly preserving majorizations of matrices*, Electron. J. Linear Algebra **15** (2006), 260–268.
4. A. M. Hasani and M. Radjabalipour, *On linear preservers of (right) matrix majorization*, Linear Algebra Appl. **423** (2007), 255–261.
5. A. Ilkhanizadeh Manesh, *Right gut-Majorization on $\mathbf{M}_{n,m}$* , Electron. J. Linear Algebra **31** (2016), no. 1, 13–26.
6. F. Khalooei, *Linear preservers of two-sided matrix majorization*, Wavelet Linear Algebra **1** (2014), no. 1, 43–50.
7. A. W. Marshall, I. Olkin, and B. C. Arnold, *Inequalities: theory of majorization and its applications*, Second edition. Springer Series in Statistics, Springer, New York, 2011.

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