

UC-MAJORIZATION AND ITS STRONGLY LINEAR PRESERVERS

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Abstract. In this paper we introduce the concept of semimajorization as a generalized form of majorization. After that we discuss uc-majorization. For $x, y \in \mathbb{R}^n$, we say x is uc-majorized by y (written as $x \prec_{uc} y$) if there exists an upper triangular column stochastic matrix A such that $x = Ay$. In our main theorem we characterize all linear maps that strongly preserve \prec_{uc} on \mathbb{R}^n . Furthermore at the end, we characterize strong linear preservers for lc-majorization.

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REFERENCES

- [1] T. ANDO, *Majorization, Doubly stochastic matrices, and comparison of eigenvalues*, Linear Algebra and its Applications **118** (1989), 163–248.
- [2] A. ARMANDNEJAD AND A. ILKHANIZADEH MANESH, *GUT-majorization and its linear preservers*, Electronic Journal of Linear Algebra **23** (2012) 646–654.
- [3] A. ARMANDNEJAD AND S. MOHTASHAMI AND M. JAMSHIDI, *On linear preservers of g -tridiagonal majorization on \mathbb{R}^n* , Linear Algebra and its Applications **459** (2014) 145–153.
- [4] A. GIOVAGNOLI AND H.P. WYNN, *G -majorization with applications to matrix orderings*, Linear Algebra and its Applications **67** (1985) 111–135.
- [5] A. M. HASANI AND M. RADJABALIPOUR, *The structure of linear operators strongly preserving majorizations of matrices*, Electronic Journal of Linear Algebra **15** (2006) 260–268.
- [6] F. KHALOOEI AND A. SALEMI, *The Structure of linear preservers of left matrix majorization on \mathbb{R}^p* , Electronic Journal of Linear Algebra **18** (2009) 88–97.
- [7] A. W. MARSHALL, I. OLKIN AND B. C. ARNOLD, *Inequalities: Theory of Majorization and Its Applications*, Springer, 2011.
- [8] M. SOLEYMANI AND A. ARMANDNEJAD, *Linear preservers of circulant majorization on \mathbb{R}^n* , Linear Algebra and its Applications **440** (2014) 286–292.
- [9] M. SOLEYMANI AND A. ARMANDNEJAD, *Linear preserver of even majorization on $M_{n,m}$* , Linear Multilinear Algebra **62** (2014) 1437–1449.