

# Preservers for classes of positive matrices

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## Abstract

It is a simple consequence of the Schur product theorem that the class of positive semidefinite matrices is preserved by the entrywise application of an arbitrary absolutely monotonic function. As shown by work of Schoenberg, the converse is also true: a function which preserves positive semidefinite matrices of any size is necessarily absolutely monotonic.

The situation is more complex for matrices of a fixed size, or when the class of matrices under study has some additional structure. This talk will address the former question and some cases of the latter, including Hankel matrices and totally non-negative matrices.

This is joint work with Dominique Guillot (University of Delaware), Apoorva Khare (Indian Institute of Science, Bangalore) and Mihai Putinar (University of California, Santa Barbara and Newcastle University).

- [1] A. Belton, D. Guillot, A. Khare and M. Putinar, Matrix positivity preservers in fixed dimension. I, *Adv. Math.* 298 (2016) 325–368.