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Linear maps which preserve convex sets and their geometric and spectral properties

Let C be a convex subset of a vector space V and let $\{x_i\}$ be a finite collection of points in C . We consider the set of all linear maps from $V \rightarrow V$ that preserve both C and all of the points $\{x_i\}$. Specific choices of C and $\{x_i\}$ give the set of correlation matrices, the set of doubly stochastic matrices and the set of positive linear maps. We explore some geometric properties of these convex sets and some spectral properties of matrices in these convex sets.