1135-47-117 **Benjamin Passer***, benjaminpas@technion.ac.il, and **Orr Moshe Shalit** and **Baruch Solel**.
Scaling and Inclusion of Matrix Convex Sets.

For a convex body $K \subset \mathbb{R}^d$, there may be many matrix convex subsets of $\bigcup_{n=1}^{\infty} M_n(\mathbb{C})^d_{sa}$ which have K as the first level. In particular, one can find a maximal matrix convex set $\mathcal{W}^{\max}(K)$ and a minimal matrix convex set $\mathcal{W}^{\min}(K)$ with this property, and these sets may be described in terms of linear inequalities and existence of dilations, respectively. We seek inclusion results, such as $\mathcal{W}^{\max}(K) \subseteq \mathcal{W}^{\min}(L)$, especially when L is a scalar multiple of K. For example, if $\overline{\mathbb{B}}_{p,d}$ is the closed unit ball of $\mathbb{R}^d$ with the ℓ^p norm, then

$$\mathcal{W}^{\max}(\overline{\mathbb{B}}_{p,d}) \subseteq d^{1-|1/p-1/2|} \cdot \mathcal{W}^{\min}(\overline{\mathbb{B}}_{p,d}),$$

and the scale $d^{1-|1/p-1/2|}$ is optimal. Moreover, the minimal and maximal matrix convex sets over K are equal if and only if K is a simplex, and this result may be strengthened to include some dimension control. In this talk, I will describe some explicit dilations related to these results and some of the convex geometry guiding our minimality arguments.

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