HYPERSPACES OF COMPACT MAX-PLUS AND MAX-MIN CONVEX SETS: NONMETRIZABLE CASE

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Given $x = (x_\alpha) \in \mathbb{R}^\tau$ and $\lambda \in \mathbb{R} \cup \{-\infty\}$ (respectively $\lambda \in \mathbb{R} \cup \{-\infty, \infty\}$), we let $\lambda \odot x = (\lambda + x_\alpha)$, $\lambda \otimes x = (\min\{\lambda, x_\alpha\})$. Let also $\oplus$ stand for the coordinatewise maximum. A subset $A \subset \mathbb{R}^\tau$ is said to be *max-plus convex* (respectively *max-min convex*) if, for every $x, y \in A$ and every $\lambda, \mu \in \mathbb{R} \cup \{-\infty\}$ with $\lambda \oplus \mu = 0$ (respectively every $\lambda, \mu \in \mathbb{R} \cup \{-\infty, \infty\}$ with $\lambda \oplus \mu = \infty$) we have $(\lambda \odot x) \oplus (\mu \odot y) \in A$ (respectively $(\lambda \otimes x) \oplus (\mu \otimes y) \in A$).

We investigate the hyperspaces $\mathrm{mpcc}(K)$ and $\mathrm{mmcc}(K)$ of compact max-plus convex (respectively max-min convex) subsets in $K \subset \mathbb{R}^\tau$, for some compact max-plus convex (respectively max-min convex) nonmetrizable K. In particular, we consider the case if K is the Tychonov cube $[0,1]^\tau$, for uncountable τ, and, more generally, $K = \prod_{\alpha<\tau} K_\alpha$, where every K_α is a compact max-plus convex (respectively max-min convex) subset of $\mathbb{R}^\omega$.

The obtained results are counterparts of those obtained in [1]. In particular, the results demonstrate that the hyperspaces $\mathrm{mpcc}(K)$ and $\mathrm{mmcc}(K)$ are close to the sets of probability (idempotent, max-min) measures than to the hyperspace $\exp K$ of all nonempty compact subsets.

We will also discuss the noncompact case.

References

[1] L. Bazylevych, D. Repovš, M. Zarichnyi, *Hyperspace of convex compacta of nonmetrizable compact convex subspaces of locally convex spaces.* Topology Appl. **155** (2008), no. 8, 764–772.

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