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Extension of Continuous Convex Functions from Subspaces II

Given Y a subspace of a topological vector space X , and an open convex set $0 \in A \subset X$, we say that the couple (X, Y) has the $\text{CE}(A)$ -property if each continuous convex function on $A \cap Y$ admits a continuous convex extension defined on A .

Using results from our previous paper, we study for given A the relation between the $\text{CE}(A)$ -property and the $\text{CE}(X)$ -property. As a corollary we obtain that (X, Y) has the $\text{CE}(A)$ -property for each A , provided (X, Y) has the $\text{CE}(X)$ -property and Y is “conditionally separable”. This applies, for instance, if X is locally convex and conditionally separable. Other results concern either the $\text{CE}(A)$ -property for sets A of special forms, or the $\text{CE}(A)$ -property for each A where X is a normed space with X/Y separable.

In the last section, we point out connections between the $\text{CE}(X)$ -property and extendability of certain continuous linear operators. This easily yields a generalization of an extension theorem of Rosenthal, and another result of the same type.

Keywords: Convex function, extension, topological vector space, normed linear space.

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