On the Monotone Polar and Representable Closures of Monotone Operators

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Abstract

Fitzpatrick proved that maximal monotone operators in topological vector spaces are representable by lower semi-continuous convex functions. A monotone operator is representable if it can be represented by a lower-semicontinuous convex function. The smallest representable extension of a monotone operator is its representable closure. The intersection of all maximal monotone extensions of a monotone operator, its monotone polar closure, is also representable. A natural question is whether these two closures coincide. In finite dimensional spaces they do coincide. The aim of this talk is to analyze such a question in the context of topological vector spaces. In particular, we prove in this context that if the convex hull of a monotone operator is not monotone, then the representable closure and the monotone polar closure of such operator do coincide.

Keywords: Monotone operator, representable operator, monotone polar, closure, topological vector space.