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Journal of Convex Analysis 26 (2019) 687–698

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Convex Decompositions of Convex Open Sets with Polytopes or Finite Sets Removed

We provide convex decompositions for the convex open sets with polytopes or finite sets removed, some of which are minimal in a certain sense. The valence of a function $f: O \rightarrow \mathbb{R}^n$, whose restrictions to all convex subsets of $O \subseteq \mathbb{R}^n$ are injective, cannot exceed the number of convex components of such decompositions. It is therefore worth to investigate the smallest number of convex subsets of O needed to cover O . While the convex decompositions of the mentioned open complements are the main issue of this paper, a few remarks on this smallest number are provided by the end of the paper in the last section.

Keywords: Convex decompositions, CIP-functions, valence of a function.

MSC: 47H05; 47H99