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V. Soltan
Dept. of Mathematical Sciences, George Mason University, Fairfax, U.S.A.
vsoltan@gmu.edu

Approximation of Convex Sets by Homothetic Copies of Polyhedra

We characterize the closed convex sets $K \subset \mathbb{R}^n$ which satisfy the following approximation condition: for any given point $v \in \mathrm{rint} K$ and a scalar $\varepsilon > 0$, there is a polyhedron $P \subset \mathbb{R}^n$ such that $v \in \mathrm{rint} P$ and $P \subset K \subset v + (1+\varepsilon)(P - v)$.

Keywords: Convex set, polyhedron, approximation, neighborhood, homothetic, M-decomposable set.

MSC: 52A20, 90C25.