

# Older and Recent Developments in Set-Valued Approximation

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Set-valued functions (functions mapping a closed real interval to general compact sets in  $R^n$ ) find applications in different fields such as economy, optimization, dynamical systems, control theory, game theory, differential inclusions, geometric modeling. In the recent decades, analysis along with the approximation of set-valued functions (SVFs, multifunctions) have been developing rapidly. Older approaches investigate mostly multifunctions with convex compact images. The standard tools here are the Minkowski linear combinations, the support functions and the Aumann integral. Yet, if the images of set-valued functions are not necessarily convex, then the techniques based on these tools may fail. Design and analysis of approximation methods for SVFs with general compact sets it is more challenging task and needs different approaches.

Metric approximations allow to approximate set-valued functions with compact, not necessarily convex values. This talk surveys the progress on the metric approximation of set-valued functions. We will focus on some new developments as the Fourier approximation and integral operators on multifunctions of bounded variation. The results extend classical theorems for real functions of bounded variation to set-valued ones.

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