

## סמינר מדעי היסוד

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גב' אלונה מוחוב  
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### Approximation of Multifunctions with Compact Images in $R^n$ based on the Metric Average

In this work some initial investigations of the approximation of set-valued functions (SVFs, multifunctions) with general compact images in  $R^n$  are presented. The research is motivated by the problem of the reconstruction of 3D objects or 2D shapes from their parallel cross-sections. Other possible applications are in Control Theory.

Linear operations on sets are usually understood in Minkowski sense (algebraic sum). However, the Minkowski average is appropriate for set-valued functions with convex images. If the images of a multifunction are nonconvex, then the approximating methods may fail. Therefore, in order to obtain an approximant a binary averaging operation between two compact sets called the "metric average" is used. In this work we consider two types of approximations: the first is Schoenberg approximation operator (B-spline approximation) and another one is Bernstein approximation. We show that an approach using B-splines can approximate SVFs with general compact images in  $R^n$  in the Hausdorff metric. In the second approach we prove an approximation result in a rather restricted case. Examples illustrating the approximation results are presented.

מתאמים: ד"ר י. סטאנצ'סקו, ד"ר ש. מיברג, פרופ' י. גולדמן ופרופ' ד. פישלוב

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