Mathematics > Functional Analysis

On p-Compact mappings and p-approximation

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The notion of p-compact sets arises naturally from Grothendieck's characterization of compact sets as those contained in the convex hull of a norm null sequence. The definition, due to Sinha and Karn (2002), leads to the concepts of p-approximation property and p-compact operators, which form a ideal with its ideal norm κ_p. This paper examines the interaction between the p-approximation property and the space of holomorphic functions. Here, the p-compact analytic functions play a crucial role. In order to understand this type of functions we define a p-compact radius of convergence which allow us to give a characterization of the functions in the class. We show that p-compact holomorphic functions behave more like nuclear than compact maps. We use the ϵ-product, defined by Schwartz, to characterize the p-approximation property of a Banach space in terms of p-compact homogeneous polynomials and also in terms of p-compact holomorphic functions with range on the space. Finally, we show that p-compact holomorphic functions fit in the framework of holomorphy types which allows us to inspect the κ_p-approximation property. Along these notes we solve several questions posed by Aron, Maestre and Rueda in [2].

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