

Some notions of compactness in Functional Analysis and one related question about diametral dimensions

Comprehensible Seminar

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The diametral dimension, denoted by Δ , is a topological invariant on the class of topological vector spaces. Besides, there exists another diametral dimension, denoted by Δ_b , which was claimed to be equal to Δ in Fréchet(-Schwartz) spaces. However, this equality has never been proved.

In this talk, we make some reminders about Functional Analysis and some related concepts (seminorms, locally convex spaces, etc.) and we insist on some notions linked to compactness. We also introduce the associated notions of Montel spaces and Schwartz spaces.

Then, we introduce the question about the equality of the two diametral dimensions and we explain why this is directly solved in non-Montel spaces and in Montel but not Schwartz spaces. Next, we describe some recent, positive, partial results in the context of Schwartz spaces. Finally, we explain what happens when we consider these diametral dimensions in non-metrizable locally convex spaces.