Comprehensible Seminar

Diametral dimension of topological vector spaces

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The concept of diametral dimension was introduced in 1961 by Bessaga, Pelczynski, Rolewicz and Mityagin as a topological invariant. Thus, it was used in a first time to prove that two topological vector spaces are not isomorphic. Then, a result due to Dynin and Mityagin showed that the diametral dimension can characterize two important types of functional spaces : Schwartz spaces and nuclear spaces. More recently (2010), Jean-Marie Aubry and Françoise Bastin determined the diametral dimension of S^ν spaces and found that all these spaces have the same diametral dimension (when they are locally p-convex).

In this presentation, the notion of topological invariants is introduced. Then, Kolmorov's diameters are considered in order to define the diametral dimension of a topological vector space. After some properties, we study a practical example of spaces for which the diametral dimension is known (i.e. Köthe sequence spaces). Finally, we look at some properties of the diametral dimension in the context of Schwartz spaces and nuclear spaces and we consider the case of S^ν spaces.