

Banach Algebras 2009

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Multi-normed spaces

ABSTRACT. A *multi-normed space* is a Banach space E equipped with a sequence of norms on the linear spaces E^n ($n \in \mathbb{N}$) satisfying certain conditions. These objects were introduced by H. G. Dales and M. E. Polyakov, however an equivalent concept was studied earlier by G. Pisier and J. M. Nhani.

We shall discuss the various equivalent characterizations of multi-normed spaces, including a theorem of Pisier which characterizes these objects in terms of embeddings of Banach spaces into Banach lattices.

We shall show how multi-norms can be used to generalize the concept of an amenable locally compact group and give some applications relating modules over the group algebra $L^1(G)$.