

Normed and Banach groups

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We define normed and Banach groups and show that a locally convex space is a normed (Banach) group iff it is a normed (Banach) space. We show that the completion of a normed group is a Banach group, a (closed) subgroup of a (Banach) normed group is a (Banach) normed group, finite products of (Banach) normed groups are (Banach) normed groups. We characterize normed and Banach groups among the classes of locally compact abelian groups, linear abelian groups and Schwartz groups. Three representations of Banach and normed groups are given. With these, we show that each locally quasi-convex abelian group embeds into the product of a family of reflexive Banach groups. Consequently, an abelian topological group is locally quasi-convex iff it embeds into a reflexive group. We introduce and study the wider classes of almost normed groups and almost Banach groups and prove a closed graph theorem for almost Banach groups. The obtained results are published in [1].

References

- [1] S. Gabriyelyan, Normed and Banach groups, J. Pure Appl. Algebra **1** (2024), 107557.