Let $G$ be a topological group that can be embedded into a topological vector space. The authors say that $G$ has invariant linear span if all linear spans of $G$ under arbitrary embeddings into topological vector spaces are isomorphic as topological vector spaces. As the main result, they prove that the topological group $\mathbb{Z}^{(A)}$ has invariant linear span (which is isomorphic to $\mathbb{R}^{(A)}$), where $A$ is an arbitrary non-empty set and $\mathbb{Z}^{(A)}$ is the direct sum of $|A|$-many copies of the discrete group of integers endowed with the Tychonoff product topology. They also present an example of a topological group which does not possess the mentioned property.

Reviewer: Zoran Kadelburg (Beograd)

MSC:
46A99 Topological linear spaces and related structures
22A99 Topological and differentiable algebraic systems

Keywords:
topological group; topological vector space; embedding; absolutely Cauchy summable; topologically independent; Diophantine approximation

Full Text: DOI arXiv

References:
[1] Banach, S., Theory of Linear Operations (1987), Amsterdam: North-Holland, Amsterdam · Zbl 0613.46001
[2] Bourbaki, N., Espaces vectoriels topologiques Chapitres 1 à 5 (2007), Berlin, Heidelberg: Springer, Berlin, Heidelberg · Zbl 1186.46003
[3] Dikranjan, D.; Shakhmatov, D.; Spěvák, J., Direct sums and products in topological groups and vector spaces, J. Math. Anal. Appl., 437, 1257-1282 (2016) · Zbl 1335.22004 · doi:10.1016/j.jmaa.2016.01.037
[4] Gabriyelyan, SS; Morris, SA, Free topological vector spaces, Topol. Appl., 223, 30-49 (2017) · Zbl 1381.46002 · doi:10.1016/j.topol.2017.03.006
[5] Hájek, P.; Montesinos Santalucía, V.; Vanderwerff, J.; Zizler, V., Biorthogonal Systems in Banach Spaces (2008), Berlin: Springer, Berlin · Zbl 1136.46001
[6] Kalton, NJ, Basic sequences in \((F_{\cdot})\)-spaces and their applications, Proc. Edinb. Math. Soc., 19, 151-167 (1974) · Zbl 0296.46010 · doi:10.1017/S0013013300010282
[7] Singer, I., Bases in Banach Spaces I (1970), Berlin, Heidelberg, New York: Springer, Berlin, Heidelberg, New York · Zbl 0198.16601 · doi:10.1007/978-3-642-51633-7
[8] Spěvák, J., Topologically independent sets in precompact groups, Topol. Appl., 235, 269-274 (2018) · Zbl 1382.22009 · doi:10.1016/j.topol.2017.12.020
[9] Tkachenko, MG, On completeness of free abelian topological groups, Sov. Math. Dokl., 27, 341-345 (1983) · Zbl 0521.22002

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.