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Quasi-Banach spaces. (English) [Zbl 1059.46004](#)

Johnson, W. B. (ed.) et al., Handbook of the geometry of Banach spaces. Volume 2. Amsterdam: North-Holland (ISBN 0-444-51305-1/hbk). 1099-1130 (2003).

Quasi-Banach spaces are respectable. To be sure, the spectacular failure of some of our favorite theorems (Hahn-Banach and Krein-Milman) has given them a bad press. Nevertheless, they have not only a decent theory in their own right, but also applications to other areas. For example, the introduction here mentions the role of the naturally occurring Hardy spaces H^p , for $p < 1$, in studying holomorphic functions of several variables. Section 4 shows how quasi-Banach spaces and quasi-linear mappings arise naturally in solutions of the “three space problem”; indeed the category of Banach spaces is too small for this topic. The connections between quasi-linear mappings and the Hyers-Ulam problem about stability of linear functions is also mentioned. They are also connected with interpolation spaces, for which one recent reference is [*M. Cwikel, N. Kalton, M. Milman, and R. Rochberg, Adv. Math.* 169, No. 2, 241–312 (2002; [Zbl 1022.46017](#))].

This survey gives a comprehensive account of the theory of quasi-Banach spaces without overselling the applications. Other topics discussed at length include the negative solution to the basic sequence problem for quasi-Banach spaces, the existence of spaces (even quotients of subspaces of L_p for $p < 1$) whose algebras of bounded linear operators are one-dimensional, examples of quasi-Banach spaces with trivial duals yet which admit compact operators, tensor products, quasi-Banach algebras, quasi-Banach lattices, and analytic functions taking values in quasi-Banach spaces. The concluding section briefly mentions the problem of topological and uniform classification of linear metric spaces.

For the entire collection see [[Zbl 1013.46001](#)].

Reviewer: [David Yost \(Ballarat\)](#)

MSC:

- [46A16](#) Not locally convex spaces (metrizable topological linear spaces, locally bounded spaces, quasi-Banach spaces, etc.)
- [46B03](#) Isomorphic theory (including renorming) of Banach spaces
- [46-00](#) General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to functional analysis

Cited in **2** Reviews
Cited in **43** Documents

Keywords:

[quasi-Banach space](#)