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**An abstract algebraic-topological approach to the notions of a first and second dual space.**

III. (English) [Zbl 1361.46004](#)

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Summary: Here we continue to develop a concept, that generalizes the idea of the second dual space of a normed vector space in a fairly general way. As in the prequel, the main tool is to recognize the “first dual” as a means to the end of the second dual. Especially, we will easily prove here some essential statements on embeddings of noncommutative  $C^*$ -algebras in their second dual, whose analogues are known in the commutative setting.

For Part I see [Theory and applications of proximity, nearness and uniformity. Caserta: Dipartimento di Matematica, Seconda Università di Napoli; Rome: Aracne. 275–297 (2009; [Zbl 1235.46007](#))], for Part II see [Int. J. Pure Appl. Math. 84, No. 5, 651–667 (2013)].

**MSC:**

- [46A20](#) Duality theory for topological vector spaces
- [46B10](#) Duality and reflexivity in normed linear and Banach spaces
- [46H15](#) Representations of topological algebras
- [46L05](#) General theory of  $C^*$ -algebras
- [46L10](#) General theory of von Neumann algebras

Cited in 1 Document

**Keywords:**

second dual; noncommutative  $C^*$ -algebra; Gelfand theorem

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