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LINEAR TOPOLOGICAL DIVISION ALGEBRAS

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1. **Introduction.** We present a generalization of the familiar theorem of Frobenius that any finite-dimensional linear division algebra A over the real number field is isomorphic to the real, the complex, or the quaternion number system. The generalization consists in replacing the hypothesis of finite dimensionality of A by the weaker hypothesis that A be a complete linear space with a topology in which multiplication is continuous and which is based on a countable system of convex open sets.

Previous generalizations of Frobenius' theorem have been indicated or proved by S. Mazur [6],¹ G. Silov [8], and I. Gelfand [4]. These writers have generally assumed that A have a norm; and only that case has been adequately considered in which scalar multiplication by complex numbers is assumed. We shall give the proof of the general case without limiting ourselves to the commutative case or to complex scalars.

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¹ Numbers in brackets refer to the bibliography at the end of the paper.