

## ON SOME CHARACTERIZATIONS OF $Q$ -ALGEBRAS FOR UNITAL LOCALLY PSEUDOCONVEX ALGEBRAS

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**Abstract.** In [10] there were studied some equivalent conditions for locally  $m$ -pseudoconvex algebra to be a  $Q$ -algebra. The proofs were given using the submultiplicative property of the elements of the family of pseudoseminorms that define the topology of the algebra. In this paper it is shown that the submultiplicativity condition of pseudoseminorms is not necessary for some of the equivalent conditions.

### 1. Introduction

We consider a topological algebra  $E$  over  $\mathbb{C}$  with separately continuous multiplication. A topological algebra  $E$  is called  $Q$ -algebra when the set  $Q_{\text{inv}}(E)$  of quasi-invertible elements of  $E$  is open. A unital algebra  $E$  is called a  $Q$ -algebra when the set  $\text{Inv}(E)$  of invertible elements of  $E$  is open. It is well known that Banach algebras are  $Q$ -algebras but they are not the only ones. This kind of algebras have been studied by several researchers ([1],[3],[5]), some of them have given equivalent conditions for topological algebras to be  $Q$ -algebras. In [8] has been given some equivalent conditions for unital complex normed algebras. Later, in [5], [10] and [11] were given analogous conditions for non unital seminormed, locally  $m$ -convex and unital locally  $m$ -pseudoconvex algebras, respectively. In all these papers, it is assumed that the norms, seminorms or pseudoseminorms, that give the topology for studied topological algebras, have the submultiplicative condition.

In this paper will be studied some characterizations of unital locally pseudoconvex  $Q$ -algebras. Notice, that, in this case, the submultiplicative condition for the pseudoseminorms is not needed.

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