

Preface

During the golden era of Functional Analysis around the sixties of the last century, the Theory of Distributions was already a *legend*, being considered as the paradise of the theory of locally convex (topological vector) spaces, the latter brought to that perfection by the famous Bourbaki group, in France, among them Laurent Schwartz himself and Jean Dieudonné, yet Alexander Grothendieck, George Mackey in the United States, Gottfried Köthe in Germany, just to mention quite a few of the main contributors to nowadays theory of locally convex spaces.

It is certain that we have already a plethora of books on the subject matter of the work in hand, that is the *Theory of* (the so-called Schwartz) *Distributions*. Of course the fact is not surprising when taking into account the importance of the subject and its vast amount of applications throughout mathematics, included here (mathematical) physics, a subject made such(!) after its formal (rigorous) shaping in the hands of great masters of the matter, as e.g. the late L. Schwartz, J. Dieudonné, J.-J. Lions, to name but a few.

However, the present account offered by the authors has its own merit, this mainly due to the clarity of exposition and the elementary way of presenting it, yet in a quite rigorous manner, let alone its thoroughness. These striking issues of the present writing are just the outcome of the experience, from the part of the authors, of many years teaching the subject in the class accompanied by the relevant tests and reactions from the audience. The authors, well-known experts in Topological Algebra Theory, a flourishing subject of present-day Functional Analysis, hence connoisseurs as well, of ramified theoretical details of the theory, as the latter became in the hands of the masters of the subject, succeed in presenting their theme precisely, and also in a quite comprehensible and down to earth manner. This makes

the treatise accessible even to undergraduates as it should actually be the case, given its significance in mathematics, as mentioned in the beginning, and also in physics, theoretical and experimental alike.

Nowadays, we have already generalized aspects of the above classical theory of distributions, aiming at dealing with the awkward for the applications problem of “*multiplication of distributions*” in that the (ordinary/point-wise) product in the (vector) space of distributions does not always fall in the same space, something already (re)marked by L. Schwartz himself and also by P. Levy. In that direction we have the work of F. Colombeau and E.E. Rosinger, as also of others, with applications again in physics, yet in problems of *quantum gravity*. Furthermore, the same theory of (Schwartz) distributions might be considered as the “paradise” of topological (non-normed (!)) algebras, for instance, the latter being also a thriving subject today, even in the standard operator-theory régime, the classical acropolis of Banach algebra theory. We thus meet here a vindication indeed of the prediction of the late M.A. Naimark, in that “... *the theory of generalized functions* [: distributions] *of Laurent Schwartz ... should play an essential rôle in* [the theory of] *topological (... non-normed) rings* [: algebras] ...”, the latter discipline being also viewed, as *important* [(!)] *for many applications* (the same author as before [the italics above is ours]).

All told, this nice and really quite enjoyable work in hand offers to the reader a leisurely pedagogical, as well as, a quite rigorous introduction to the subject of generalized functions à la Schwartz, an important area of classical and of contemporary substance alike, in an elementary and clear-cut manner. But anyway, ... *what can be said at all, can be said clearly* (!) (the italics ours), to recall here L. Wittgenstein. I found the book in hand marvelously corresponding to the above maxim, so that I wish, and also can hope, of its being very well received in the mathematical/physical community today.

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