

## GENERALIZED ROUMIEU TEMPERED ULTRADISTRIBUTIONS

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**Abstract.** The aim of this paper is to introduce and to study a new classes of generalized functions of Colombeau type containing the space of tempered Roumieu ultradistributions.

### 1. Introduction

It is fundamental to provide a more general framework of a differential algebra of generalized functions containing the spaces of ultradistributions as well as their tempered ones, because of the great importance they have in studying the quantum field theory, convolution equations, harmonic analysis, pseudo-differential theory, time-frequency analysis, and other fields of analysis. For more details see [18] and [25].

Generalized Gevrey ultradistributions of Colombeau type have been defined, but as a side-theme, in [15]. The first paper aiming to introduce differential algebras containing ultradistributions is [21] and even the interesting approach of the article [11]. However, a Colombeau type theory of generalized Gevrey ultradistributions has been addressed in [4], where a kernel of a complete theory was developed and has also introduced a new way of defining the differential algebras of generalized Gevrey ultradistributions which makes such a complete theory possible. In [3] and [2] a general construction of generalized Gevrey ultradistribution algebras was given and has shown why in [4] different Gevrey exponents occurred in the embedding of Gevrey ultradistribution spaces. The authors in [1] introduce new general algebras of generalized functions containing Roumieu ultradistributions and study the embedding of these spaces and in [5] authors develop a microlocal analysis suitable for them by introducing a notion of generalized regularity which coincides with ultradifferentiability.

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