Beyond Gevrey regularity

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We introduce a class of ultradifferentiable functions which describes a new type of local regularity. They contains Gevrey functions. We investigate the continuity properties of certain (ultra)differentiable operators and discuss inverse-closedness property for our classes. Finally, we define a new type of wave front sets and present our main result:

$$\mathrm{WF}_{0,\infty}(P(D)u) \subseteq \mathrm{WF}_{0,\infty}(u) \subseteq \mathrm{WF}_{0,\infty}(P(D)u) \cup \mathrm{Char}(P),$$

where u is a Schwartz distribution, $P(D)$ is a partial differential operator with constant coefficients and $\mathrm{WF}_{0,\infty}$ is the wave front set described in terms of new regularity conditions.