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Marat V. Markin* (mmarkin@csufresno.edu), Department of Mathematics, California State University, Fresno, 5245 N. Backer Ave, M/S PB 108, Fresno, CA 93740-8001. *On the Gevrey Ultradifferentiability of Weak Solutions of an Abstract Evolution Equation with a Scalar Type Spectral Operator on the Real Axis*. Preliminary report.

Given the abstract evolution equation

$$y'(t) = Ay(t), \quad t \in \mathbb{R},$$

with a *scalar type spectral operator* A in a complex Banach space, we find conditions on A , formulated exclusively in terms of the location of its spectrum in the complex plane, *necessary and sufficient* for all *weak solutions* of the equation, which a priori need not be strongly differentiable, to be strongly Gevrey ultradifferentiable of order $\beta \geq 1$, in particular *analytic* or *entire*, on \mathbb{R} . We also reveal certain inherent smoothness improvement effects and show that, if all weak solutions of the equation are Gevrey ultradifferentiable of orders less than one, then the operator A is necessarily *bounded*. The important particular case of the equation with a *normal operator* A in a complex Hilbert follows immediately. (Received September 01, 2019)