1167-47-312 Marat V. Markin* (mmarkin@csufresno.edu), Department of Mathematics, California State University, Fresno, 5245 N. Backer Avenue, M/S PB 108, Fresno, CA 93740-800. On the Smoothness of Weak Solutions of an Abstract Evolution Equation with a Scalar Type Spectral Operator on the Real Axis.

Given the abstract evolution equation

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

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 differentiable, to be infinite differentiable or 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 is necessarily bounded. The important particular case of the equation with a normal operator A in a complex Hilbert space follows immediately. (Received March 09, 2021)