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On Computational Properties of Cauchy Problems

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Abstract: In this talk, we will discuss recent quantitative versions of results on the asymptotic behavior of nonlinear semigroups generated by an accretive operator due to O. Nevanlinna and S. Reich [1] as well as H.-K. Xu [2]. These results rely on a particular assumption on the underlying operator introduced by A. Pazy [3] under the name of ‘convergence condition’. We will see various notions of a ‘convergence condition with modulus’ which provide the appropriate quantitative information on this condition in several different ways. These notions, as well as the extraction of quantitative information on the convergence results of Nevanlinna and Reich as well as Xu, were obtained through the use of logical techniques from proof mining [4,5], a subdiscipline of mathematical logic that aims at the extraction of new information from proofs of noneffective mathematical results. The extracted information will be in particular in the form of rates of convergence which depend on these moduli for the convergence condition. This is joint work with Nicholas Pischke.

References:

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- [5] N. Pischke. Logical metatheorems for accretive and (generalized) monotone set-valued operators. *ArXiv e-prints*, 2022. arXiv, math.LO, 2205.01788.

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