On maximal regularity of evolutionary equations

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In this talk we shall provide a first order system perspective to maximal regularity and show that maximal regularity results can be obtained for equations having coefficients with memory effects and delay terms. The classical parabolic case being a very particular special case, we shall show that within the presented Hilbert space context classical strategies like using C_0-semigroups and their analyticity properties can be circumvented, thus providing a different approach to maximal regularity as is commonly discussed in the literature.
Our findings will be exemplified by classical examples and also more sophisticated ones involving fractional time-derivatives. The results also extend to a class of second order integro-differential equations.
The talk is based on joint work with Rainer Picard and Sascha Trostorff and can be found in [Picard, R.; Trostorff, S.; Waurick, M. On Maximal Regularity for a Class of Evolutionary Equations; Journal of Mathematical Analysis and Applications, 449(2): 1368?1381, 2017]