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The maximal regularity estimates for abstract evolution equations

It is a well-known fact that the solvability of the abstract inhomogeneous Cauchy problem

$$u' + Au = f \quad \text{with} \quad u(0) = x \in X \tag{ACP}$$

depends essentially on the geometry of the underlying Banach space X. In this context, the classical results due to Da Prato and Grisvard assert that such solvability improves significantly if (ACP) is considered in the real interpolation spaces between X and the domain of A. After a brief discussion of this phenomenon, I will present an extension of Da Prato-Grisvard theory that has new and noteworthy implications for the solvability of (ACP).

References.

[1] S. Król, M. Mastyło, J. Sarnowski, *Maximal regularity estimates for the abstract Cauchy problems*, preprint

[2] S. Król, J. Sarnowski, *The invariant subspaces of periodic Fourier multipliers with application to abstract evolution equations*, arXiv:2301.12451

[3] S. Król, *The maximal regularity property of abstract integro-differential equations*, J. Evol. Equ. 23 (2023)