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Pseudodifferential operators and maximal $L^p$-regularity

In the analysis of evolution equations, pseudodifferential operators appear in a natural way, e.g., in connection with the reduction to the boundary method. One approach to prove well-posedness (local in time) of the nonlinear equation is to show maximal $L^p$-regularity for the linearized problem. In the talk we will discuss several classes of (vector-valued) pseudodifferential operators and maximal regularity results for them. Apart from pseudodifferential operators in the whole space or on a closed manifold, so-called singular Green operators appear in the theory of boundary value problems. For a suitably defined class of singular Green operators, maximal regularity can be shown using the concept of $\mathcal{R}$-boundedness. As an application, we mention the Stokes equation in cylindrical domains.