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Stokes Equation with Low Regular and Measure Data

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The Stokes equations in bounded smooth domains will be examined with respect to the class of anisotropic fractional Bessel potential and Besov spaces. Notions of solutions extending the usual maximal parabolic regularity for the Stokes operator will be considered. In particular, low regular or singular data, such as those that involve Radon measures either in the interior, boundary, or at the initial time, will be addressed. Having in mind applications to optimal control problems dealing with point evaluations of the velocity, stress, or pressure, we shall also deal with the corresponding analysis for the linearized Navier–Stokes equation and its associated dual problem. Trace, mixed-derivative, and time-space embedding theorems concerning anisotropic function spaces obtained from abstract vector-valued harmonic analysis play important roles in the study.

Keywords: PDEs with measures, interpolation-extrapolation spaces, generalized solutions, maximal parabolic regularity

MSC2020: 76D03, 76D07, 35R06