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Holomorphic functional calculus for the Dirichlet Laplacian on weighted Sobolev spaces

We consider the Laplace operator with Dirichlet boundary conditions on the half-space and on bounded C^1-domains. We prove that this operator admits a bounded H^∞-calculus on Sobolev spaces with power weights measuring the distance to the boundary. As a consequence we derive new maximal regularity results for the heat equation on weighted Sobolev spaces. In case of the half-space we additionally study the Dirichlet heat semigroup and we show that this semigroup, in contrast to the L^p-case, has polynomial growth.

This is joint work with Nick Lindemulder, Emiel Lorist and Mark Veraar.