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Besov regularity of parabolic and hyperbolic PDEs

We study the regularity of solutions of (nonlinear) parabolic and hyperbolic PDEs on specific Lipschitz domains $\Omega \subset \mathbb{R}^d$. In particular, we are interested in smoothness estimates in the adaptivity scale

$$L_q((0,T), B^{\sigma}_{\tau,\tau}(\Omega)), \qquad \frac{1}{\tau} = \frac{\sigma}{d} + \frac{1}{p},$$

of spaces of Besov type. The (maximal) regularity $\sigma > 0$ in this scale is closely related to the order of approximation that can be achieved by adaptive and other nonlinear approximation methods. It turns out that, especially for solutions of parabolic PDEs on polyhedral cones, the Besov regularity is significantly higher than the Sobolev regularity which justifies the use of adaptive algorithms. Similar results are true for hyperbolic PDEs on special Lipschitz domains. The results are based on joint work with S. Dahlke.