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**Maximal L^p -regularity for mixed-order systems in Sobolev spaces
related to the Newton polygon**

Maximal regularity in L^p -spaces is one of the main tools to prove local well-posedness of nonlinear parabolic equations. In several applications, mixed-order systems appear in a natural way, e.g. in thermoelastic plate models. We will discuss methods and results on maximal L^p -regularity for general mixed-order systems. The main method to treat these equations uses the Newton polygon and the connected notion of N-parabolicity. The Newton polygon describes inherent inhomogeneities of the symbol in a geometrical way and is the basis for the definition of non-standard Sobolev spaces. We will present the definition and main results of N-parabolicity and some applications.