# Symmetric gradient Orlicz–Sobolev spaces

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**Abstract**

Sobolev type spaces of vector-valued functions, defined in terms of the sole symmetric part of their gradient, provide a natural functional framework for the analysis of systems of partial differential equations shaping mathematical models for several physical phenomena. Relevant instances include the theory of (generalized) Newtonian fluids, and the classical theories of plasticity and nonlinear elasticity. The nonlinearities driving some of these models call for the use of symmetric gradient Sobolev spaces built upon norms which are not merely of Lebesgue type.

Some recent results in the theory of Sobolev spaces associated with general rearrangement-invariant norms will be presented, with an emphasis on the case of Orlicz norms. In particular, Korn type inequalities between the full gradient and the symmetric gradient of functions will be discussed. Optimal Sobolev type embeddings for symmetric gradients will be especially focused. Related results, of independent interest, will also be exhibited. They include global approximation and extension theorems under minimal assumptions on the domain, and a formula for the $K$-functional of symmetric gradient Sobolev spaces.