

Polyconvex energy densities in nonlinear elasticity model an important class of materials for which existence of minimizers is known.

However, there are materials as for instance shape-memory materials which are not polyconvex. The minimization of the related energy functionals involves a study of their quasiconvexification. In order to understand this better in the context of the so-called geometrically linear theory of elasticity, the notion of symmetric polyconvexity is of interest. I will present characterizations and examples. Moreover, I will present some results on the notion of gradient polyconvexity, a notion that allows for a refinement of the theory of non-simple materials and has already proven to be useful in shape-memory alloys.