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Elliptic integrands in geometric variational problems.

Elliptic integrands are used to model anisotropic energies in variational problems. These energies are employed in a variety of applications, such as crystal structures, capillarity problems and gravitational fields, to account for preferred inhomogeneous and directionally dependent configurations. After a brief introduction to variational problems involving elliptic integrands, I will present an overview of the techniques I have developed to prove existence, regularity and uniqueness properties of the critical points of anisotropic energies. In particular, I will present the anisotropic extension of Allard's rectifiability theorem and its applications to the Plateau problem. Furthermore, I will describe the anisotropic counterpart of Alexandrov's characterization of volume-constrained critical points. Finally, I will mention some of my ongoing and future research projects.