

LOWER SEMICONTINUITY AND PRINCIPAL MAPS

Daniel Faraco

Morrey's notion of quasiconvexity characterizes energy integrands for which the corresponding energy is sequentially weakly lower semicontinuous in Sobolev spaces, provided that the integrands satisfy suitable growth conditions. However, such growth conditions fail for integrands penalizing deformations whose determinant is negative, as is desirable, e.g., in hyperelasticity. The understanding of lower semicontinuity in this setting beyond polyconvexity remains largely open.

I will describe how a strengthening of the quasiconvexity notion, related to the principal maps in Kari Astala's talk, yields lower semicontinuity theorems. This new notion can often be understood locally and provides a solution to Morrey's problem for a class of volumetric-isochoric split functionals. The talk is based on a program developed with Jan Kristensen, Kari Astala, Andre Guerra and Aleksis Koski.