

INTEGRAL CONVEXITY AND PARABOLIC SYSTEMS

FRANK DUZAAR

ABSTRACT. In this talk we give optimal, i.e. necessary and sufficient, conditions for integrals of the Calculus of Variations to guarantee the existence of solutions – both *weak* and *variational solutions* – to the associated L^2 -gradient flow. The initial values are merely L^2 -functions with possibly infinite energy. In this context, the notion of *integral convexity*, i.e. the convexity of the variational integral and not of the integrand, plays the crucial role; surprisingly, this type of convexity is weaker than the convexity of the integrand. We demonstrate this by means of certain quasi-convex and non-convex integrands.

The results are obtained in joint work with Verena Bögelein (Salzburg), Bernard Dacorogna (Lausanne), Paolo Marcellini (Florence) and Christoph Scheven (Duisburg-Essen)

FRANK DUZAAR, DEPARTMENT MATHEMATIK, UNIVERSITÄT ERLANGEN–NÜRNBERG, CAUER-STRASSE 11, 91058 ERLANGEN, GERMANY

E-mail address: frank.duzaar@fau.de