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Weak Forms of Jacobian and Hessian

Abstract: This talk is presentation of a joint work with Irene Fonseca. We study weak continuity properties of the Hessian and relaxation of the functional

$$F_H(u,\Omega) = \int_\Omega |\det \nabla^2 u|\,dx$$

in connection with pointwise Hessian and weak forms of the Hessian.

Also, we revisit the theory of weak Jacobian, mostly for comparison, but some results obtained at this occasion seem to be new.

In particular, one cannot expect in general that mollifications of the weak Jacobian or Hessian converge a.e. to the pointwise Jacobian or Hessian. The situation is better if the weak Jacobian (Hessian) is a measure.