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8. Analysis

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Characterization of homogeneous scalar variational problems solvable for all boundary data

In this paper we introduce a condition on lower semicontinuous integrands $L : R^n \to R$ both necessary and sufficient for all problems of the form

$$J(u) = \int_\Omega L(Du)dx \to \min, u \in W^{1,1}(\Omega), u\Big|_{\partial\Omega} = f$$

to have a solution, provided Ω and f are sufficiently regular or certain conditions on the growth of L at infinity are assumed.

This approach touches many questions in the Calculus of Variations and some problems in Continuum Mechanics. We will discuss some connections with recent research in the area of anti-plane shear static problems.