Regularity and sufficient conditions for strong local minimality

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An outstanding question in the Calculus of Variations is that of finding sufficient conditions on extremals to ensure that they furnish strong local minimizers. Grabovsky and Mengesha [1] showed that, for quasiconvex integrands, assuming an priori C^1-regularity on the extremals is enough. We present here an alternative proof of this fact and we discuss a regularity result up to the boundary that further enables us to establish the sufficiency result for Lipschitz extremals whose gradient is in VMO. See also [2].

References:

[1] Y. Grabovsky and T. Mengesha. Sufficient conditions for strong local minima: the case of C^1 extremals. *Trans. Amer. Math. Soc.,* 361(3):1495-1541, 2009.

[2] J. Kristensen and A. Taheri. Partial Regularity of Strong Local Minimizers in the Multi-Dimensional Calculus of Variations. *Arch. Ration. Mech. Anal.,* 170(1):63-89, 2003.