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A. Amir

University of Mostaganem, Faculty of Sciences, Dept. of Mathematics, 27000 Mostaganem, Algeria amir@univ-mosta.dz

H. Mokhtar-Kharroubi

University of Oran, Faculty of Sciences, Dept. of Mathematics, Oran, Algeria hmkharroubi@yahoo.fr

Normality and Quasiconvex Integrands

Let (T, \mathcal{A}) be an arbitrary measurable space and f an integrand defined on $T \times \mathbb{R}^n$ such that $f(t, \cdot)$ is quasiconvex and lower semicontinuous. Here, convexity is present by the level set mapping. We show that the normality property of the integrand in the sense of R. T. Rockafellar [Pacific Journal of Mathematics 24 (1968) 525–539; and in: Nonlinear Operators and the Calculus of Variations; Bruxelles 1975, Lecture Notes in Mathematics 543, 157–207, Springer, Berlin] can be characterized by the normality of the level set mapping, and that normality is preserved for quasiconvex conjugates. Finally we obtain for the integral $I_f(x(\cdot)) = \int_T f(t, x(t)) d\mu(t)$ the equality (in appropriate topology) between the lower semicontinuous regularization and the second quasiconvex conjugate.

Keywords: Normal integrand, quasiconvex functions, conjugation.

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