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Regularity of solutions for some variational problems subject to a convexity constraint

We first study the minimizers, in the class of convex functions, of an elliptic functional with nonhomogeneous Dirichlet boundary condition. We prove C^1 regularity of the minimizers under the assumption that the upper envelope of admissible functions is C^1 . This condition is optimal at least when the functional depends only on the gradient. We then give various extensions; in particular, we consider a problem without boundary conditions arising in an economic model introduced by Choné and Rochet.