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On a Neumann problem for variational functionals of linear growth

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Abstract. We consider a Neumann problem for strictly convex variational functionals of linear growth. We establish the existence of minimisers among $W^{1,1}$-functions provided that the domain under consideration is simply connected. Hence, in this situation, the relaxation of the functional to the space of functions of bounded variation, which has better compactness properties, is not necessary. Similar $W^{1,1}$-regularity results for the corresponding Dirichlet problem are only known under rather restrictive convexity assumptions limiting its non-uniformity up to the borderline case of the minimal surface functional, whereas for the Neumann problem no such quantified version of strong convexity is required.

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