

Title: On the existence of sub-differentials

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It is an often fact that the assumption of lower semi-continuity of a convex function, defined on an infinite dimensional space, appears, just, to ensure that the sub-gradients set is non-empty. In our presentation we give an example of convex function with effective open domain, that is not lower semi-continuous, and show that the set of subgradients is non-empty, regardless of whether the function to be lower semi-continuous.