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On a Minimax Theorem: an Improvement, a New Proof and an Overview of its Applications

Theorem 1 of the author in *"Multiplicity of global minima for parametrized functions"* [Rend. Lincei Mat. Appl. 21 (2010) 47–57], a minimax result for functions $f : X \times Y \to \mathbf{R}$, where Y is a real interval, was partially extended to the case where Y is a convex set in a Hausdorff topological vector space as Theorem 3.2 in *A strict minimax inequality criterion and some of its consequences* [Positivity 16 (2012) 455–470]. As a key tool in the proof a partial extension of the same result for the case where Y is a convex set in $\mathbf{R}^n$ of S. J. N. Mosconi [Theorem 4.2 in *"A differential characterisation of the minimax inequality"*, J. Convex Analysis 19 (2012) 185–199] was used. In the present paper, we first obtain a full extension of the first result mentioned above by means of a new proof fully based on the use of the result itself via an inductive argument. Then, we present an overview of the various and numerous applications of these results.

Keywords: Minimax; quasi-concavity; inf-compactness; global minimum; multiplicity.

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