Cordaro, Giuseppe

On a minimax problem of Ricceri. (English) Zbl 0986.49003

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Summary: Let E be a real separable and reflexive Banach space, $X \subseteq E$ weakly closed and unbounded, Φ and Ψ two non-constant weakly sequentially lower-semicontinuous functions defined on X, such that $\Phi + \lambda\Psi$ is coercive for each $\lambda \geq 0$. In this setting, if

$$\sup_{\lambda\geq 0}\inf_{x\in X}(\Phi(x)+\lambda(\Psi(x)+\rho)) = \inf_{x\in X}\sup_{\lambda\geq 0}(\Phi(x)+\lambda(\Psi(x)+\rho))$$

for every $\rho \in \mathbb{R}$ then one has

$$\sup_{\lambda\geq 0}\inf_{x\in X}(\Phi(x)+\lambda\Psi(x)+h(\lambda)) = \inf_{x\in X}\sup_{\lambda\geq 0}(\Phi(x)+\lambda\Psi(x)+h(\lambda))$$

for every concave function $h : [0, +\infty[\to \mathbb{R}$.

MSC:

49J35 Existence of solutions for minimax problems

Keywords:

minimax problem; concave function; weak coerciveness; weakly sequentially lower-semicontinuity

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