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Regularity for nonlinear variational evolution inequalities in Hilbert spaces. (English)

Zbl 0993.34060

Cho, Yeol Je (ed.), Differential equations and applications. Proceedings of the international conference on mathematical analysis and applications, Chinju, China, August 3-4, 1998. Huntington, NY: Nova Science Publishers. 157-169 (2000).

Let H and V be two real separable Hilbert spaces such that V is a dense subspace of H . Let the single-valued operator A be given which is hemicontinuous and coercive from V to V^* . Here, V^* stands for the dual space of V . Let $\varphi : V \rightarrow (-\infty, +\infty]$ be a lower semicontinuous proper convex function. The authors study the existence, uniqueness and a variation of solution to the following initial value problem

$$\frac{dx(t)}{dt} + Ax(t) + \partial\varphi(x(t)) \notin f(t, x(t)) + h(t), \quad t \in [0, T],$$

$x(0) = x_0$, where $f : \mathbb{R} \times V \rightarrow H$ is Lipschitz continuous, $h : \mathbb{R} \rightarrow H$ and $\partial\varphi : V \rightarrow V^*$ is the subdifferential multivalued operator of φ defined by

$$\partial\varphi(x) = \{x^* \in V^* : \varphi(x) \leq \varphi(y) + (x^*, x - y), \quad y \in V\},$$

where (\cdot, \cdot) denotes the duality pairing between V^* and V .

For the entire collection see [Zbl 0973.00042].

Reviewer: Mouffak Benchohra (Sidi Bel Abbes)

MSC:

34G25 Evolution inclusions

49J24 Optimal control problems with differential inclusions (existence) (MSC2000)

47J20 Variational and other types of inequalities involving nonlinear operators (general)

49J40 Variational inequalities

Cited in 1 Document

Keywords:

nonlinear variational evolution inequality; maximal monotone operators; subdifferential operator; regularity