

Implicit Euler scheme for an abstract evolution inequality

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Abstract

For a triple $\{V, H, V^*\}$ of Hilbert spaces, we consider an evolution inclusion of the form $u'(t) + A(t)u(t) + \delta\varphi(t, u(t)) \ni f(t)$, $u(0) = u_0$, $t \in (0, T]$, where $A(t)$ and $\varphi(t, \cdot)$, $t \in [0, T]$, are a family of nonlinear operators from V to V^* and a family of convex lower semicontinuous functionals with common effective domain $D(\varphi) \subset V$. We indicate conditions on the data under which there exists a unique solution of the problem in the space $H^1(0, T; V) \cap W^\infty(0, T; H)$ and the implicit Euler method has first-order accuracy in the energy norm. © 2011 Pleiades Publishing, Ltd.

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