

Asymptotic Behavior of Bounded Solutions to a Class of Second Order Nonhomogeneous Evolution Equations

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Abstract

By using previous results of B. Djafari Rouhani [7-9] for dissipative systems, we study the weak and strong convergence of solutions to the following class of second order nonhomogeneous evolution equations

$$\begin{cases} u''(t) - cu'(t) \in Au(t) + f(t) & \text{a.e. } t \in (0, +\infty) \\ u(0) = u_0, \sup_{t \geq 0} |u(t)| < +\infty \end{cases}$$

where A is a monotone operator in a real Hilbert space H , $c \geq 0$, and $f : \mathbb{R}^+ \rightarrow H$ is a given function. Our results extend previous results by Morosanu [15,16] and Mitidieri [14] who studied the case $c = 0$ and $f \equiv 0$ by assuming that A is maximal monotone and $A^{-1}(0) \neq \emptyset$, as well as previous results by Véron [20,21] and the authors [10,11] who studied the case $f \equiv 0$. Some applications are also presented.

Keywords and phrases. Second order evolution equation, nonhomogeneous, monotone operator, asymptotic behavior, almost nonexpansive curve, ergodic theorem.

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