CONVERGENCE ESTIMATES FOR ABSTRACT SECOND ORDER SINGULARLY PERTURBED CAUCHY PROBLEMS WITH MONOTONE NONLINEARITIES*

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Abstract

We study the behavior of solutions to the problem

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\begin{cases}
\varepsilon\Big(u_\varepsilon''(t) + A_1 u_\varepsilon(t)\Big) + u_\varepsilon'(t) + A_0 u_\varepsilon(t) + B\big(u_\varepsilon(t)\big) = f_\varepsilon(t), & t \in (0, T), \\
u_\varepsilon(0) = u_{0\varepsilon}, \quad u_\varepsilon'(0) = u_{1\varepsilon},
\end{cases}
$$

in the Hilbert space H as $\varepsilon \to 0$, where A_1, A_0 are two linear self-adjoint operators and B is a locally Lipschitz and monotone operator.