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Asymptotic Behavior of Solutions to a Second-Order Gradient Equation of Pseudo-Convex Type

Consider in a real Hilbert space H the second order gradient equation

$$u''(t) = \nabla\phi(u(t)), \quad t \geq 0.$$

We state and prove several results on the weak or strong convergence of bounded solutions of this equation to minimizers of ϕ, where $\phi\colon H \to \mathbb{R}$ is a continuously differentiable, pseudo-convex function with $\operatorname{Argmin}\phi \neq \varnothing$. Our results extend previous results in the literature that are related to the case when ϕ is convex.

Keywords: Convex function, pseudo-convex function, minimum point, critical point, second order gradient system, asymptotic behavior.

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