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Convergence of solutions to Cahn-Hilliard equation. (English) Zbl 0936.35032

Commun. Partial Differ. Equations 24, No. 5-6, 1055-1077 (1999).

The authors show the convergence to an equilibrium as $t \to \infty$ of solutions to the Cahn-Hilliard equation

$$u_t = \Delta(-\varepsilon^2\Delta u + W_u(u)),\ u(0) = u_0 \text{ in } \Omega; \quad \frac{\partial u}{\partial \nu} = 0 = \frac{\partial}{\partial \nu}(-\varepsilon^2\Delta u + W_u(u)) \text{ on } \partial\Omega.$$

W is assumed to be analytic in u, which allows them to proof a Łojasiewicz inequality for the associated gradient flow in $W^{-1,2}(\Omega)$, which they use in turn to prove the convergence for the associated class of nonlinear parabolic equations by a method modeled by *L. Simon* [Ann. Math., II. Ser. 118, 525-571 (1983; Zbl 0549.35071)]. The paper also contains an existence and uniqueness result with the appropriate regularity for solutions providing the background for the study of the asymptotic behaviour.

Reviewer: Marianne Korten (Warszawa)

MSC:

35B40 Asymptotic behavior of solutions to PDEs
35K60 Nonlinear initial, boundary and initial-boundary value problems for linear parabolic equations
35K35 Initial-boundary value problems for higher-order parabolic equations

Cited in **53** Documents

Keywords:

Łojasiewicz inequality; convergence to equilibria

Full Text: DOI

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