Errors analysis for two methods approximating the classical Caginalp's model

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The paper concerns with the error analysis of two time-stepping schemes used in the discretization of the phase-field transition system with a classical regular potential (Caginalp's model) and Neumann boundary conditions. Using energy methods, we establish L^∞ error estimates for the implicit Euler and a fractional steps method. A numerical experiment validates the theoretical results (see [1]), comparing the accuracy of the methods (see [2], [3]).
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Keywords. nonlinear PDE of parabolic type, reaction-diffusion equations, finite difference methods, fractional steps method, stability and convergence of numerical methods, performance of numerical algorithms, thermodynamics, phase-changes.

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