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Finite elements for a class of nonlinear stochastic pdes from phase transition problems

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Abstract

We construct Galerkin numerical schemes with possible discontinuities in time for a class of nonlinear evolutionary pdes with additive noise. These equations appear in phase transitions problems and may involve a positive parameter ε which stands as a measure for the inner interfacial regions width. Our goal is to establish existence of numerical solution and derive optimal error estimates even for the discontinuous Galerkin case in the presence of noise.

Key words: Finite elements, nonlinear stochastic pdes, dG methods.