Robust a posteriori estimates for the stochastic Cahn-Hilliard equation

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I will discuss the derivation a posteriori error estimates for a fully discrete finite element approximation of the stochastic Cahn-Hilliard equation. The a posteriori bound is obtained by a splitting of the equation into a linear stochastic partial differential equation (SPDE) and a nonlinear random partial differential equation (RPDE) and estimating the errors on suitable probability subsets.
The resulting estimate is robust with respect to the interfacial width parameter and is computable since it involves the discrete principal eigenvalue of a linearized (stochastic) Cahn-Hilliard operator.
Furthermore, the estimate is robust with respect to topological changes as well as the intensity of the stochastic noise. We provide numerical simulations to demonstrate the practicability of the proposed adaptive algorithm.