Strong Nonlocal-to-Local Convergence of the Cahn-Hilliard Equation and its Operator

Christoph Hurm

04. May 2023

We prove convergence of a sequence of weak solutions of the nonlocal Cahn-Hilliard equation to a strong solution of the corresponding local Cahn-Hilliard equation. The analysis is done in the case of sufficiently smooth bounded domains with Neumann boundary condition and a $W^{1,1}$-kernel. The proof is based on the relative entropy method. Additionally, we prove the strong L^2-convergence of the nonlocal operator to the negative Laplacian together with a rate of convergence.