FROM NONLOCAL TO LOCAL CAHN-HILLIARD EQUATION

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Abstract. In this paper we prove the convergence of a nonlocal version of the Cahn-Hilliard equation to its local counterpart as the nonlocal convolution kernel is scaled using suitable approximations of a Dirac delta in a periodic boundary conditions setting. This convergence result strongly relies on the dynamics of the problem. More precisely, the $H^{-1}$-gradient flow structure of the equation allows to deduce uniform $H^1$ estimates for solutions of the nonlocal Cahn-Hilliard equation and, together with a Poincaré type inequality by Ponce, provides the compactness argument that allows to prove the convergence result.

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