Coarsening in nonlocal interfacial systems

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Abstract: Abstract: We consider coarsening in interfacial systems driven by nonlocal energies. Of particular interest are the nonlocal Cahn–Hilliard equation and models of biological aggregation. The energies considered cause the system to separate into phases. The pattern of interfaces evolves under nonlocal surface-tension-type effects. The typical length scales grow and the pattern coarsens. We prove a rigorous upper bound on the coarsening rate.

The proof uses the energy-based approach to estimates on rate of coarsening introduced by Kohn and Otto. To show the required estimates on the flatness of the energy landscape we develop a geometric approach which is applicable to a wider class of problems, which includes ones based on local, gradient type energies.