

Variational methods and phase space decomposition in semilinear parabolic equations

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Abstract

We discuss variational methods for the analysis of longtime dynamics in semilinear parabolic equations. We focus on how energy functionals and related variational structures can be used to decompose the phase space and classify different dynamical regimes. Through the interplay between variational methods and dynamical systems, we illustrate how qualitative properties such as global existence, blow-up, and stability can be characterized, highlighting the scope and limitations of this approach.