

Maximal Attractors for Some Nonlinear PDEs

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In this talk I will present recent systematic study on existence of maximal attractors or universal attractors for some nonlinear partial differential equations, including the coupled Cahn-Hilliard equations, the phase-field equations of Penrose-Fife model, the system of one-dimensional compressible viscous and heat-conductive fluids, and the corresponding systems in higher space dimensions in annular domains. The important features of these problems are: the metric space we work with is incomplete; there are some conservation laws associated with each system which results in necessity of restricting ourselves to a family of topological subspaces; these systems are highly quasilinear, and a basic lemma in analysis has been established and used to prove existence of an absorbing set; some systems are nonlinear hyperbolic-parabolic coupled systems, and because of existence of hyperbolic part, the orbit is not compact, and a notion of universal attractors and the framework with weak topology is used. All these four papers jointly with W. Shen, and Y. Qin, respectively, have been accepted for publications.