Compact convergence approach to reduction of infinite dimensional systems to finite dimensions

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We consider parameter dependent semilinear evolution problems for which, at the limit value of the parameter, the problem is finite dimensional. We introduce an abstract functional analytic framework that applies to many problems in the existing literature for which the study of the asymptotic dynamics can be reduced to finite dimensions via the invariant manifold theory. Some practical models are considered to show the wide applicability of the theory.