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Parameterization Method for Stable/Unstable Manifolds of Periodic Points for Maps

The Parameterization Method is a general functional analytic framework for studying invariant manifolds of dynamical systems. We develop a version of the method for stable/unstable manifolds associated with periodic points of discrete time dynamical systems. The novelty of our approach is that by introducing new variables we are able to avoid computing compositions of the map. We describe the method in general and implement the method for some one and two dimensional manifolds in some two and three dimensional dynamical systems.