# Approximation of Invariant Surfaces by Periodic Orbits in High-Dimensional Maps: Some Rigorous Results

Stathis Tompaidis

**Abstract**

The existence of an invariant surface in high-dimensional systems greatly influences the behavior in a neighborhood of the invariant surface. We prove theorems that predict the behavior of periodic orbits in the vicinity of an invariant surface on which the motion is conjugate to a Diophantine rotation for symplectic maps and quasiperiodic perturbations of symplectic maps. Our results allow for efficient numerical algorithms that can serve as an indication for the breakdown of invariant surfaces.