

Cone Conditions and Covering Relations for Normally Hyperbolic Invariant Manifolds

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We present a new proof of the existence of normally hyperbolic invariant manifolds for maps. In contrast to the usual approach, the proof is performed in the phase space of the dynamical system, rather than on an infinitely dimensional functional space. This fact allows to formulate the assumptions in such a way that they are verifiable using rigorous numerics. The method gives explicit bounds on the region in which the manifold is contained and an explicit estimate on the size of the perturbation under which the manifold persists. The proof is based on the method of covering relations, Brouwer fixed point theory and cone conditions.