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Effective hyperbolicity and applications of new Hadamard-Perron theorems.

The Hadamard-Perron theorem gives some control over dynamics near a hyperbolic trajectory. In the classical approach to non-uniform hyperbolicity via Pesin theory, the strength of this control is given in terms of asymptotic properties of the trajectory; these are then determined almost everywhere using ergodic theory. This renders the theory difficult to use for systems where existence of an SRB measure has not yet been established. We introduce a notion of "effective hyperbolicity" that bounds the strength of this control without recourse to ergodic theory, allowing us to prove new versions of the Hadamard-Perron theorem. Applications include construction of SRB measures and a finite-information closing lemma. (Received December 01, 2012)