

Non-compact dynamical systems
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Let $\{f \circ i_t\}$ be a real action on the locally compact separable metric space X . Let \mathcal{V} denote the real valued functions on X which are non-increasing on orbits. The (generalized) recurrent set \mathcal{R} consists of those $x \in X$ for which all $f \in \mathcal{V}$ are constant on the orbit of x . The set \mathcal{R} (which contains the non-wandering set) can be characterized intrinsically by means of prolongational limit sets.

We consider those dynamical systems (“gradient flows”) for which the generalized recurrent set \mathcal{R} is empty. This is an essentially non-compact phenomenon. A subclass consists of the dispersive, or parallelizable systems, and the most general gradient flow is a union of parallelizable ones. Moreover, we show how to synthesize gradient flows from a family of parallelizable flows.