Mathematics > General Topology

Extending maps by injective σ-Z-maps in Hilbert manifolds

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The aim of the paper is to prove that if M is a metrizable manifold modelled on a Hilbert space of dimension $\alpha \geq \aleph_0$ and F is its σ-Z-set, then for every completely metrizable space X of weight no greater than α and its closed subset A, for any map $f: X \to M$, each open cover $\mathcal{U}$ of M and a sequnce $(A_n)_n$ of closed subsets of X disjoint from A there is a map $g: X \to M$ $\mathcal{U}$-homotopic to f such that $g\bigr|_A = f\bigr|_A$, $g\bigr|_{A_n}$ is a closed embedding for each n and $g(X \setminus A)$ is a σ-Z-set in M disjoint from F. It is shown that if $f(\partial A)$ is contained in a locally closed σ-Z-set in M or $f(X \setminus A) \cap \bar{f(\partial A)} = \empty$, the map g may be taken so that $g\bigr|_{X \setminus A}$ be an embedding. If, in addition, $X \setminus A$ is a connected manifold modelled on the same Hilbert space as M and $\bar{f(\partial A)}$ is a Z-set in M, then there is a $\mathcal{U}$-homotopic to f map $h: X \to M$ such that $h\bigr|_A = f\bigr|_A$ and $h\bigr|_{X \setminus A}$ is an open embedding.

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