Strong shape and homology of continuous maps

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In paper [1] the fiber resolution and fiber expansion of continuous maps are defined and it is shown that any fiber resolution is a fiber expansion. In this paper we have defined a strong fiber expansion. We have shown that any fiber resolution is a strong fiber expansion. Besides, we have proved an analogous lemma of the Main Lemma about strong expansion [2]. Using the obtained results and methods of strong shape theory [2] we have constructed a strong fiber shape category of maps of compact metric spaces.

In the second part of this paper, we have constructed the strong homological functor from the strong shape category of maps of compact metric spaces to the category of sequences of Abelian groups and level mophisms. Using the obtained results we have defined the homological functor $\mathbf{H} : \mathbf{Mor_{CM}} \to \mathbf{Ab}$, which is strong shape invariant and has the semi-continuous property. Besides, we give an example of a map $f : X \to Y$ with trivial spectral homology and non-trivial strong homology groups.

[1] V. Baladze, *Fiber shape theory*, Proc. A. Razmadze Math. Inst. (2003), no. 132, 1–70
[2] S. Mardešić, *Strong shape and homology*, Springer-Verlag, Berlin (2000)

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