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STABILITY OF MULTIVALUED ATTRACTORS

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Abstract. Stimulated by recent problems in the theory of iterated function systems, we provide a variant of the Banach converse theorem for multivalued maps. In particular, we show that attractors of continuous multivalued maps on metric spaces are stable. Moreover, such attractors in locally compact, complete metric spaces may be obtained by means of the Banach theorem in the hyperspace.

1. Introduction

Multivalued maps and their attractors are studied in relation to dynamical systems, for instance iterated function systems, backward dynamics or differential inclusions. Throughout the whole paper, we consider continuous multivalued maps with compact values which generate continuous operators on hyperspaces, as discussed in the next section.

Our motivation is the following. We would like to state a variant of János theorem for operators on hyperspaces induced by multivalued maps. Under János theorem, we understand the results on the converse of Banach theorem developed in [18], [26], [17], [24], [25], [31]. In spite of the metric nature of the Banach theorem, these papers provide several topological conditions on a map to be a contraction.

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