How to measure the distance between orbits, and what comes from that?

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Abstract

I will describe methods for measuring the distance between orbits of a dynamical system given by an action of a continuous self map T on a compact metric space X. As a result of such a measurement, one usually obtains a pseudo-metric on X, which is rarely compatible with (continuous with respect to) the metric that initially comes with X. Such pseudo-metrics are called dynamically defined pseudo-metrics. The pseudo-metrics of Besicovitch, Weyl, Feldman-Katok, and mean-orbital pseudo-metric are examples of dynamically defined pseudo-metrics. I will illustrate the theory with examples and applications. Furthermore, I will explore what happens when a dynamically defined pseudo-metric is continuous with respect to the initial metric on the phase space. This condition usually singles out an interesting class of systems. The talk will be based on the results obtained collaborating with several mathematicians (F. Cai, F. García-Ramos, J. Li, M. Łącka, P. Oprocha, H. Pourmand).