Complexity, sensitivity, dimension and weak chaos.

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We study indicators of sensitivity to initial conditions and orbit complexity in topological dynamical systems and their relations. The orbit complexity is a measure of the asymptotic behavior of information that is necessary to describe the orbit of a given point. The indicator generalizes, in a certain sense, the Brudno's orbit complexity (which is strongly related to the entropy of the system). The initial condition sensitivity indicators consider the asymptotic behavior of the speed of divergence of nearby starting orbits. The indicators have non trivial values also in weakly chaotic dynamical systems, characterizing various cases of weakly chaotic dynamics. Then, using constructivity, local relations are proved between generalized orbit complexity, initial condition sensitivity and the dimension of the underlying space or invariant measure. The generalized relations are then applied to the study of an important example of weakly chaotic dynamics: the Manneville map.

References

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