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How restrictive is topological dynamics?

Comment.Math.Univ.Carolinae 38,3 (1997) 563-569.

Abstract: Let T be a permutation of an abstract set X . In ZFC, we find a necessary and sufficient condition in terms of cardinalities of the T -orbits that allows us to topologize (X, T) as a topological dynamical system on a compact Hausdorff space. This extends an early result of H. de Vries concerning compact metric dynamical systems. An analogous result is obtained for \mathbf{Z}^2 -actions without periodic points.

Keywords: abstract dynamical system, pointwise periodic system, symbolic dynamics, \mathbf{Z}^2 -action

AMS Subject Classification: 54H20