James P Kelly* (j_kelly@baylor.edu) and Timothy Tennant. Topological Entropy of Set-valued Functions. Preliminary report.

Let \((X, d)\) be a compact metric space, and let \(f\) be a set-valued function on \(X\). For each \(n \in \mathbb{N}\), define the set of \(n\)-orbits to be

\[ \text{Orb}_n(f) = \{(x_0, \ldots, x_n) | x_i \in f(x_{i-1}) \text{ for } 1 \leq i \leq n\}. \]

Given \(n \in \mathbb{N}\) and \(\varepsilon > 0\), a set \(S \subseteq \text{Orb}_n(f)\) is called an \((n, \varepsilon)\)-spanning set if, for every \((x_0, \ldots, x_n) \in \text{Orb}_n(f)\), there exists \((s_0, \ldots, s_n) \in S\) such that \(d(s_i, x_i) < \varepsilon\) for all \(0 \leq i \leq n\). Let \(r_{n,\varepsilon}\) be the minimum cardinality of an \((n, \varepsilon)\)-spanning set for \(f\), and define the topological entropy of \(f\) to be

\[ h(f) = \lim_{\varepsilon \to 0} \lim_{n \to \infty} \frac{1}{n} \log r_{n,\varepsilon}. \]

We discuss the relationship between the entropy of \(f\) and the entropy of \(f^m\), and we establish sufficient conditions for a set-valued function to have positive or infinite entropy. (Received September 09, 2014)