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On distributional chaos and subshifts

Distributional chaos was introduced in 1994 by Schweizer and Smítal. The strongest version of this property is defined in the following way.

Let $f\colon X \to X$ be a continuous map acting on a compact metric space (X, ρ). For any positive integer n, points $x, y \in X$ and $t \in \mathbb{R}$ let

$$\Phi_{xy}^{(n)}(t) = \frac{1}{n} \left|\{i \ : \ \rho(f^i(x), f^i(y)) < t \quad , 0 \le i < n\}\right|$$

where $|A|$ denotes the cardinality of the set A. Denote by Φ_{xy} and Φ_{xy}^* the following functions

$$\Phi_{xy}(t) = \liminf_{n\to\infty} \Phi_{xy}^{(n)}(t) \quad , \quad \Phi_{xy}^*(t) = \limsup_{n\to\infty} \Phi_{xy}^{(n)}(t).$$

If there is an uncountable set $S \subset X$ so that $\Phi_{xy}(s) = 0$ for some $s > 0$ and $\Phi_{xy}^*(t) = 1$ for all $t > 0$, provided that $x, y \in S$, $x \neq y$, then we say that f is distributionally chaotic.

Many interesting results on distributional chaos were obtained via tools of symbolic dynamics. In this talk we will survey some recent results and state a few open problems.