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Dynamical Systems on Point Processes and Geometric Routing in Stochastic Networks

This talk is motivated by the study of geometric routing algorithms used for navigating stationary point processes. The mathematical abstraction for such a navigation is a class of non-measure preserving dynamical systems on counting measures called point-maps. The talk will focus on two objects associated with a point map f acting on a stationary point process Φ : * The f-probabilities of Φ, which can be interpreted as the stationary regimes of the routing algorithm f on Φ. These probabilities are defined from the compactification of the action of the semigroup of point-map translations on the space of Palm probabilities. The f-probabilities of Φ are not always Palm distributions. * The f-foliation of Φ, a partition of the support of Φ which is the discrete analogue of the stable manifold of f, i.e., the leaves of the foliation are the points of \Phi with the same asymptotic fate for f. These leaves are not always stationary point processes. There always exists a point-map allowing one to navigate the leaves in a measure-preserving way. Joint work with Mir-Omid Haji-Mirsadeghi, Sharif University, Department of Mathematics.