USNA Math Department Colloquium

Tower multiplexing and slow weak mixing

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Abstract: Ergodic theory is a branch of mathematics that studies statistical properties of dynamical systems and its connection to other fields. A measure preserving dynamical system is ergodic, if its time average equals its space average. In statistics, this means the strong law of large numbers holds.

The collection of ergodic measure preserving transformations on a separable probability space is metrizable in the weak topology. In this setting, it has been known for 50+ years that typical systems are weak mixing and rigid. This is interesting, since these two properties contrast greatly. Weak mixing occurs when a system equitably spreads mass throughout the probability space for most times. Rigidity occurs when a system evolves to resemble the identity map infinitely often. It is natural to ask what types of rigidity sequences are realizable by weak mixing systems. In this talk, we show that all rigidity sequences of ergodic systems are realizable by the class of weak mixing systems. To obtain this result, we introduce a notion for multiplexing two ergodic transformations together.