Recurrence for IP Systems with Polynomial Wildcards

James T. Campbell, University of Memphis

Shortly after Szemerédi proved that a set of natural numbers with positive upper density contains arbitrarily long arithmetic progressions, Furstenberg gave a new proof using ergodic theory. This major event gave rise to the field of combinatorial ergodic theory, in which problems motivated by additive combinatorics are addressed with ergodic theory. In this talk we give a brief survey of some of the successes in the field, leading into a description of an interesting, yet still unproved result, which would provide a generalization of many earlier results. That is, we discuss a polynomial generalization of the IP Szemerédi Theorem: an IP, polynomial, multiple recurrence theorem. Along the way we present our own recent result, which is a single-recurrence version of this (could be a) theorem.

<u>Note to students</u>: We intend for this talk to be accessible to students who are familiar with measure/probability theory, and Hilbert space.

Joint work with Randall McCutcheon, also of Memphis.

