

DREXEL ANALYSIS SEMINAR

May 6, 2019

2-3 PM, Korman 245

Speaker: Thomas Yu (Drexel)

Title: Analysis of P-recurrence: a dynamical system point of view.

Abstract: D-finite functions, or the corresponding P-recurrences, encompass as special cases all hypergeometric functions and therefore can potentially appear in many applications involving special functions. (For instance, this happened to the speaker when he was analyzing a specific geometric configuration arising from biomembranes.) After reviewing the basic definition and properties, together with some simple examples, of D-finite functions and P-recurrences, a natural dynamical system associated with a P-recurrence will be presented. It is then shown that the system has a stable fixed point if and only if the dominant root of the characteristic polynomial of the recurrence is simple. The stability makes it easy to answer certain questions (e.g. positivity) about the recurrence. There are, however, interesting examples in which the dominant root is not simple. In this difficult case, a modification is proposed that stabilizes the dynamical system.