Meeting: 1003, Atlanta, Georgia, SS 26A, AMS-SIAM Special Session on Dynamic Equations on Time Scales; Integer Sequences and Rational Maps, I

1003-37-1098 **Michael A Jones*** (jonesm@mail.montclair.edu), Department of Mathematical Sciences, Montclair State University, Upper Montclair, NJ 07013, and **Diana M Thomas** (thomasdia@mail.montclair.edu), Department of Mathematical Sciences, Montclair State University, Upper Montclair, NJ 07013. *Dynamics of Nim Induced Difference Equations.*

Winning and losing positions in the well-known two-player game Nim are defined recursively as a two symbol sequence depending on a k-parameter set known as the subtraction set. In this paper, we write the recursion as a nonlinear dynamical system defined on the phase space $\mathbb{Z}_2^{s_k}$ with the binary sequence for Nim generated by the appropriate initial conditions. The transient dynamics and Garden of Eden points are completely determined for arbitrary sized subtraction sets. A characterization of cycle lengths for two parameter subtraction sets is determined. Extensions of the two parameter case to an arbitrary sized subtraction set are explored. (Received October 03, 2004)