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Periodic points classify some families of Markov shifts

Consider the space X_G of doubly-indexed sequences over a finite abelian group G satisfying

$$x_{s,t+1} = x_{s,t} + x_{s+1,t}$$

for all integers s, t. The left and downward shift induce an action of $\mathbf{Z}^2$ on X_G. Recently, we could prove a conjecture by Ward stating that the periodic point data of X_G determine the group G up to isomorphism. Our approach is to view X_G as the set of sequences annihilated by $T-(S+1)$ where S, T stand for the two shift actions, and to study algebraic sets of sequences via their annihilators in the polynomial ring $\mathbf{Z}[S, T]$. We will sketch a proof of this theorem and show that our method extends to many other spaces defined by linear recurrences over groups. Key words are Galois Rings, Teichmuller systems and Wieferich primes. The p-adic representation of binomial and multinomial coefficients comes into play.