

Title: On the $3x+1$ and $3x+d$ Conjectures

Abstract:

We give results relating to the $3x+1$ and $3x+d$ conjectures, proposed by Collatz and Lagarias respectively. We give a condition for which a primitive cycle will exist for a certain d , and list the first few primitive cycles found in this way. We also define formal grammars from the inverse $3x+1$ and $3x+d$ maps, and restate the conjectures of Collatz and Lagarias in terms of these formal grammars.