

1103-11-25

**Marc Chamberland\*** ([chamber1@math.grinnell.edu](mailto:chamber1@math.grinnell.edu)), Grinnell, IA 50112. *Averaging Structure in the  $3x + 1$  Problem*. Preliminary report.

The famous  $3x+1$  problem has resisted analysis from multiple perspectives for many decades. This talk studies the more general  $qx + r$  problem, where  $q$  and  $r$  are odd, and finds new, averaging structures for the iterates. This structure supports the conjecture that all orbits enter a cycle if  $q = 1$  or  $3$  but most orbits diverge if  $q \geq 5$ . (Received July 24, 2014)