

1125-11-310

Thomas Brazelton (tbrazel1@jhu.edu), **Joshua Harrington** (joshua.harrington@cedarcrest.edu), **Siddarth Kannan*** (siddarth.kannan@pomona.edu) and **Matthew Litman** (my15470@psu.edu). *On Consecutive Primitive n th Roots of Unity Modulo q .*

Given $n \in \mathbb{N}$, we study the conditions under which a finite field of prime order q will have adjacent elements of multiplicative order n . In particular, we analyze the resultant of the cyclotomic polynomial $\Phi_n(x)$ with $\Phi_n(x+1)$, and exhibit Lucas and Mersenne divisors of this quantity. For $n \neq 1, 2, 3, 6$, we prove the existence of a prime q_n for which there is an element $\alpha \in \mathbb{Z}_{q_n}$ where α and $\alpha + 1$ both have multiplicative order n . Additionally, we use algebraic norms to set analytic upper bounds on the size and quantity of these primes. (Received August 25, 2016)