1106-11-426 **Joseph Stahl*** (josephmichaelstahl@gmail.com), **David Mehrle** (dmehrle@cmu.edu), **Tomer Reiter** (treiter@andrew.cmu.edu), **Dylan Yott** (dtyott@gmail.com) and **Steven Miller** (sjm1@williams.edu). *Newman's conjecture for function field L-functions.*

De Bruijn and Newman introduced a deformation of the completed Riemann zeta function $\zeta(s)$, and proved there is a real constant Λ which encodes the movement of the nontrivial zeros of $\zeta(s)$ under the deformation. The Riemann hypothesis is equivalent to the assertion that $\Lambda \leq 0$. Newman, however, conjectured that $\Lambda \geq 0$.

Andrade, Chang, and Miller extended the machinery of Newman and Polya to L-functions for function fields $\mathbb{F}_q(T)$. In this setting we must consider a modified Newman's conjecture: $\sup_{f\in\mathcal{F}} \Lambda_f \geq 0$, for $\mathcal{F}$ a family of L-functions. We prove this modified Newman's conjecture for several families of L-functions. In contrast with previous work, we exhibit specific L-functions for which $\Lambda = 0$, and thereby prove a stronger statement: $\max_{L\in\mathcal{F}} \Lambda_L = 0$. To prove this, we show a certain L-function must have a double root, which implies $\Lambda = 0$. For a different family, we construct particular elliptic curves E with $p+1$ points over $\mathbb{F}_p$ and use the Weil conjectures to conclude $\#E(\mathbb{F}_{p^{2n}})$ attains the bound over $\mathbb{F}_{p^{2n}}$. This tells us that the associated L-function satisfies $\Lambda = 0$. (Received August 27, 2014)