1135-R1-266 **Michael Brilleslyper*** (`mike.brilleslyper@usafa.edu`), 2354 Fairchild Drive Suite 6D-124, USAF Academy, CO 80908, and **Beth Schaubroeck**. *Locating the Roots of a Harmonic Polynomial.* Preliminary report.

We consider the root locations in the complex plane of the *harmonic* trinomial $q(z) = z^n + \overline{z}^k - 1$, where $n \geq 2$ and $1 \leq k < n$. We count the number of roots occurring inside, on, and outside the unit circle in terms of n and k. The function $q(z)$ has roots on the unit circle (unimodular roots) if and only if $n - k$ is divisible by $6g$, where $g = \gcd(n, k)$. We also provide a closed formula for the number of roots inside the unit circle (interior roots). In previous work, we analyzed the root locations of the related family of analytic trinomials given by $p(z) = z^n + z^k - 1$. For both $q(z)$ and $p(z)$, the unimodular roots are identical though for different conditions on n and k. Furthermore, we show the formula for the number of interior roots of $q(z)$ is closely related to the corresponding formula for $p(z)$. Finally, we note that for general harmonic polynomials the Fundamental Theorem of Algebra need not hold, however $q(z)$ always has exactly n roots. (Received August 16, 2017)