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Alperen S Sirin* (sairsirin@gmail.com), 57 West Squire Dr Apt 7, Rochester, NY 14623, and **Maria Lema** and **Maximillian Bender**. *Properties of m 'th Level Triangle Numbers in Second Order Recursive Polynomials*.

Through the application of Budan's Theorem, which relates the number of roots of a polynomial in a given interval to the sign changes in the sequence of coefficients of that polynomial, we present analytic and combinatorial properties of a generalized sequence of recursive polynomials. Here, we follow the standard initial conditions for a recursive polynomial $G_n(x)$ with $G_0(x) = -1$ and $G_1(x) = x - 1$. We consider the generalized recurrence relation $G_n(x) = x^k G_{n-1}(x) + x^\ell G_{n-2}(x)$, where ℓ and k are natural numbers. Our results include properties of the roots, the growth of the sequence of derivatives, and general structure of these polynomials. In particular, we prove that the maximal roots of the polynomials generated in the case where $\ell = k$ converge to 2 and all non zero roots of G_n for any k are irrational for $n > 2$. We also discuss the relevance of the triangle numbers in the formation of these polynomials and present a game theoretical application along with modular identities evaluating $G_n(x)$ modulo $G_1(x)$, $G_2(x)$. (Received August 23, 2015)