1125-40-2461 **Kathleen Lee*** (klee6@poets.whittier.edu), **Michelle Haver** (m-haver.1@onu.edu), **William McDermott** (willm97@vt.edu) and **Alex Wilson** (wils1256@msu.edu). *Classification of numerical sequences originating from recursive polynomial sequences.* Preliminary report.

In this talk, we classify the asymptotic behavior of sequences which can be generated from polynomials which satisfy the following recurrence relation:

$$\begin{cases} M_n(x,y) = xM_{n-1}(x,y) + yM_{n-2}(x,y) & n \geq 2 \\ M_0 = a \\ M_1 = bx + cy + d \end{cases}$$

where a, b, c, and d are real constants. We present a Binet formula for M_n, which allows us to classify these sequences using a triangle in $\mathbb{R}^2$. The sequence $M_n(x,y)$ evaluated inside the triangle converges to zero, while $M_n(x,y)$ evaluated outside the triangle diverges. We also discuss subtle behaviors on the boundary such as periodicity and convergence to a constant. Moreover, we present a finite sum expression for M_n, which can be used to generate sequences that we interpret combinatorially. One example we provide a combinatorial proof for is

$$\sum_{k=0}^{\lfloor \frac{n+1}{2} \rfloor} \left[\binom{n-k}{k} + (w-1)\binom{n-k-1}{k} \right] w^k (w-1)^k = w^n$$

Finally, we explain how the first derivative of M_n with respect to y under certain conditions generates sequences that are typically found by convolution of two numerical sequences. (Received September 20, 2016)