A&Z Sequences for Double Riordan Arrays

Donovan Branch, Geoffrey Thorpe, Morehouse College; Dennis Davenport*, Shakuan Franklin, Howard University; Jazmin T. Jones, Clark Atlanta University

A Riordan array is an infinite lower triangular matrix that is defined by two generating functions, $g$ and $f$. The coefficients of the generating function $g$ gives the first column and the $n^{th}$ column of the matrix is defined by the generating function $gf^n$. We shall call $f$ the multiplier function. Similarly, a Double Riordan array is an infinite lower triangular matrix that is defined by three generating functions, $g$, $f_1$ and $f_2$. Where the zeroth column of the Double Riordan array is $g$, the next column is given by $gf_1$ and the following column will be defined by $gf_1f_2$. The remaining columns are found by multiplying $f_1$ and $f_2$ alternatively. Thus, for a double Riordan array there are two multiplier functions, $f_1$ and $f_2$. It is known that the Riordan array only has one Z-sequence and one A-sequence. This is not the case for Double Riordan arrays. In this presentation we show that double Riordan arrays have two Z-sequences and one A-sequence.

Keywords: Riordan Array, A-sequence, Z-sequence