1165-60-200 **Alan Krinik*** (ackrinik@cpp.edu), **Hubertus von Bremen**, **Jeremy J. Lin**, **Thuy Vu Dieu Lu**, **Mark Dela**, **David Perez**, **David Beecher**, **Weizhong Wong** and **Heba Ayeda**.
Transient Probabilities of Birth-death Matrices having Alternating Probabilities on its Super and Sub Diagonals.

Suppose that P1 is an (2n+1) x (2n+1) matrix where n is a natural number. Assume P1 is also a tridiagonal transition probability matrix, having alternating probability entries along its super and sub diagonals and constant probability entries down the main diagonal. Note that P1 is assumed to be sub-stochastic in rows 1 and n and stochastic in all other rows. Then the transient probabilities after time k where k is a natural number, can be explicitly expressed using Sylvester's eigenvalue expansion which says: $P1^k$ = a linear combination of spectral projectors times the kth power of the eigenvalues. The spectral projectors and eigenvalues of the preceding matrix P1 can be described by formulas which are a function of the entries of P1 and scale up with the dimension of the state space. Finally, birth-death chains on an even numbered state space having alternating probability entries along the super and sub diagonals in its one-step transition probability matrix P2 have explicit transient probability formulas that also scale up with the dimension of the state space. (Received January 18, 2021)