1116-33-2304 **Oksana Bihun*** (`obihun@uccs.edu`). *Properties of the Zeros of the Generalized Basic Hypergeometric Polynomials.* Preliminary report.

We define the generalized basic hypergeometric polynomial of degree N in terms of the generalized basic hypergeometric function, by choosing one of its parameters to allow the termination of the series after a finite number of summands. We consider a Differential q-Difference Equation (DqDE) whose solutions are polynomials with time-dependent coefficients and whose time-independent equilibrium solutions are generalized basic hypergeometric polynomials. The time-dependent zeros of the polynomial solutions of the DqDE satisfy a nonlinear system of ODEs. From the equations for the equilibria of the latter system, we obtain a set of nonlinear algebraic equations satisfied by the zeros of the generalized basic hypergeometric polynomials. By linearizing the system about its equilibria, we obtain a remarkable $N \times N$ matrix M defined in terms of the zeros of the polynomial. The eigenvalues of the matrix M are given by neat expressions that depend only on some of the parameters of the polynomial; that is, the matrix M is *isospectral*. Moreover, in case the parameters that appear in the expressions for the eigenvalues of M are rational, the matrix M has rational eigenvalues, a *Diophantine property*. (Received September 22, 2015)