Non-linear difference equations for complex Verblunsky coefficients of orthogonal polynomials on the unit circle

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We consider orthogonal polynomials on the unit circle associated with certain semiclassical weight functions.The Pearson-type differential equations satisfied by these weight functions involve two polynomials of degree at most 2. General structure relations for the orthogonal polynomials and non-linear difference equations for the associated complex Verblunsky coefficients are presented. As an application, we present several new structure relations and non-linear difference equations associated with a special weight function, which is an extension of the circular Jacobi weight function.

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