Ratio asymptotics and zero distribution for multiple orthogonal polynomials

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Abstract

The asymptotic behavior of the ratio of orthogonal polynomials can be obtained from the three term recurrence relation and involves a quadratic equation. We give the asymptotic behavior of the ratio of two neighboring multiple orthogonal polynomials under the condition that the recurrence coefficients in the nearest neighbor recurrence relations converge. This will involve an algebraic function of higher degree. The asymptotic distribution of the zeros can be obtained from the ratio asymptotics. We illustrate the result for some families of multiple orthogonal polynomials (multiple Hermite, multiple Laguerre, multiple Charlier, multiple Meixner, Jacobi-Piñeiro).