Multiple orthogonal polynomials associated with an exponential cubic weight

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We consider multiple orthogonal polynomials associated with the exponential cubic weight e^{-x^3} over two contours in the complex plane. We give the basic properties of these polynomials, including the Rodrigues formula and nearest-neighbor recurrence relations. It turns out that the recurrence coefficients are related to a discrete Painlevé equation. The asymptotics of the recurrence coefficients, the ratio of the diagonal multiple orthogonal polynomials and the (scaled) zeros of these polynomials are also investigated.

Joint work with Galina Flipuk (Univerity of Warsaw, Poland) and Lun Zhang (Fudan University, Shanghai, China).