Asymptotic expansion of orthogonal polynomials via difference equations

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We aim to develop a simple and unified technique in finding asymptotic expansion of orthogonal polynomials from their difference equations. By preserving the symmetry in the difference equation, we are able to express the higher-order terms in the asymptotic expansion as an integral whose integrand can be explicitly obtained by a recurrence relation, while the integration constant is to be determined by a matching condition relates to the initial conditions and coefficients in the difference equation.