Abstract

For orthogonal polynomials of the form

$$p_n Q_{n+1}(x) + q_n Q_{n-1}(x) + r_n Q_n(x) = x Q_n(x), \quad Q_0(x) = 0, \quad Q_1(x) = 1,$$

where $p_n > 0$, $q_n > 0$, $r_n \in \mathbb{R}$ and $\lim_{n\to\infty} p_n = \lim_{n\to\infty} q_n = \frac{1}{2}$, a general sufficient condition is found such that the support of the measure of orthogonality is the entire interval $[-1, 1]$. Starting from this result, more general cases of orthogonal polynomials are studied as a perturbation problem. The results are applied to Pollaczek polynomials, Random-walk polynomials (RWP), Neutron-transport polynomials and generalized co-recursive polynomials.