

Non-regular polynomial orthogonality

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Abstract

Let u be a form and the corresponding Hankel determinants $\Delta_n(u)$; suppose that there exists $r \in \mathbb{N}$ such that $\Delta_n(u) \neq 0$ for $0 \leq n \leq r$ and $\Delta_{r+1}(u) = 0$. We are posing the question: for what supplementary conditions is it possible to construct a monic polynomial sequence $\{P_n\}_{n \geq 0}$ orthogonal with respect to u such that $\deg P_n = n$, $n \geq 0$? Otherwise stated \mathcal{P} must be generated by $\{P_n\}_{n \geq 0}$, which leaves out finite sequence.