Proceed. SPOA Granada Sept 1991
J.C.A.M.

Block orthogonal systems for symmetric P-forms

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Abstract

To study polynomials orthogonal with respect to the logarithmic equilibrium measure on the Julia set of a nonlinear polynomial P, Daniel Bessis and his coworkers introduced a symmetric bilinear form, the symmetric P-form. It is a nonhermitian variant of a genuine inner product, the hermitian P-form. The main reason for doing so, was the existence of a three term recurrence relation between the polynomials of successive degree of an orthogonal system.

However, this is only true if the moment matrix of the symmetric P-form is strongly regular. In this paper, we investigate what happens if this condition is not met. We distinguish between the case where an orthogonal system still exists and the one where it does not, and illustrate them by $P(z) = z^2$ and $P(z) = z^2 - 1$ respectively.

keywords: formal orthogonal polynomials, three term recurrence relation, Julia set, equilibrium measure, block orthogonal system.

AMS(MOS) classification: 42C05, 30C10, 30D05.

abbreviated title: block orthogonal systems.

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*Aspirant N.F.W.O. (Belgian National Fund for Scientific Research)
†Work partially supported by a research grant from the Belgian National Fund for Scientific Research