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Lewanowicz, Stanisław

Recurrence relations for the coefficients in Jacobi series solutions of linear differential equations.

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Let a function f defined in the interval $< -1, 1 >$ may be expanded into the Jacobi series

$$(1.1) \quad f = \sum_{k=0}^{\infty} a_k[f] P_k$$

uniformly convergent in this interval. The coefficients $a_k[f]$ have the usual, integral form (1.2) (weighting scalar product). Certain properties of the coefficients, using the difference properties of Jacobi polynomials P_k are proved (lemmas 3.1 and 3.2). The aim of this paper is to find a recurrence relation for the coefficients $a_k[f]$ in the case where the function f satisfies the linear differential equation

$$(1.11) \quad \sum_{m=0}^n (q_m f)^{(m)} = q$$

where q_m are polynomials and $a_k[q]$ are known. The main result of the paper is given in the section 4 (theorems 4.1 and 4.2). This paper was motivated by papers of C. W. Clenshaw, S. Paszkowski and J. Wimp (see references). An illustrative example is given in the section 6. S.Kus

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