Ehrich, Sven
On orthogonal polynomials for certain nondefinite linear functionals. (English) Zbl 0942.42014
J. Comput. Appl. Math. 99, No. 1-2, 119-128 (1998).

Nondefinite linear functionals $L_n[f] = \int_\mathbb{R} w(x)f^{(n)}(x)dx$, i.e., polynomials P_m of degree $\leq m$ satisfying the relation $\int_\mathbb{R} w(x)(P_m(x)x^k)^{(n)}dx = 0$ are considered. The problem is studied whether there exist polynomials P_m which satisfy the foregoing relation and all of whose zeros are real. Nonexistence of orthogonal polynomials with all zeros real in several cases are proved. The cases studied include different relations between w, n, and r. The connection with moment preserving spline approximation is used for the proofs.

Reviewer: Václav Burjan (Praha)

MSC:

42C05	Orthogonal functions and polynomials, general theory of nontrigonometric harmonic analysis
33C45	Orthogonal polynomials and functions of hypergeometric type (Jacobi, Laguerre, Hermite, Askey scheme, etc.)
26C10	Real polynomials: location of zeros
65D07	Numerical computation using splines
41A15	Spline approximation

Cited in **1** Document

Keywords:

nondefinite linear functionals; orthogonal polynomials; zeros; spline approximation

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