

Weighted polynomial interpolation on the roots of four kinds of Chebyshev polynomials

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This talk is devoted to the study of some discrete processes on the roots of four kinds of Chebyshev polynomials. Starting from the Lagrange interpolation polynomials we shall construct wide classes of discrete processes using summations generated by a summation function φ and by loosening the strict condition on the degrees of polynomials.

We will give necessary and sufficient conditions on the function φ ensuring that our processes fulfill some interpolatory properties. We also investigate how can we obtain the well-known Lagrange and Hermite–Fejér types of interpolations. Some other useful applications will be considered as well.

We are going to investigate the uniform convergence of our processes in suitable Banach spaces $(C_w[-1, 1], \|\cdot\|_w)$ of continuous functions (w denotes a weight). We formulate a theorem of uniform convergence regarding the summation function φ , which is analogous to the well-known theorem of G. M. Natanson and V. V. Zuk.

References

- [1] L. Szili and P. Vértesi, On summability of weighted Lagrange interpolation. I (General weights), *Acta Math. Hungar.*, **101**(4) (2003), 323–344.
- [2] L. Szili, Uniform convergent discrete processes on the roots of four kinds of Chebyshev polynomials, *Annales Univ. Sci. Budapest.*, **44** (2002), 35–62.
- [3] L. Szili and P. Vértesi, On uniform convergence of sequences of certain linear operators, *Acta Math. Hungar.*, **91**(1–2) (2001), 159–186.
- [4] G. Mastroianni and J. Szabados, Hermite–Fejér interpolation with Jacobi weights, *Studia Scientiarum Mathematicarum Hungarica*, **48**(3) (2011), 408–420.
- [5] G. M. Natanson and V. V. Zuk, *Trigonometric Fourier Series and Approximation Theory*, Izdat. Leningrad Unta, Leningrad (1983).