$$\widetilde{\Delta}_h^m(f) := \widetilde{\Delta}_h^m(f,t) = \widetilde{\Delta}_h^1(\Delta_h^{m-1}(f),t) = (F_h - \mathbb{I})^m(f,t) = \sum_{k=0}^{m} k^{m-k}\binom{m}{k} F_{h,k}(f,t),$$

where $m = 2,3,\ldots$, $F_{h,0}(f) := f$, $F_{h,k}(f) := F_h(F_{h,k}(f))$ and $\mathbb{I}$ is the identity operator in $B\mathcal{S}_{\mathbf{M}}$. Consider the following smoothness characteristics

$$\widetilde{\omega}_m(f,\delta) := \sup_{0\le h\le \delta} \|\widetilde{\Delta}_h^m(f)\|_{\mathbf{M}}, \quad \delta > 0.$$

By G_{λ_n} we denote the set of all B-a.p. functions whose Fourier exponents belong to the interval $(-\lambda_n, \lambda_n)$ and define the value of the best approximation by

$$E_{\lambda_n}(f)_{\mathbf{M}} = \inf_{g\in G_{\lambda_n}} \|f-g\|_{\mathbf{M}}.$$

Theorem 1. *For arbitrary numbers $n \in \mathbb{N}$ and $m > 0$, and for any function $f \in B\mathcal{S}_{\mathbf{M}}$, with the Fourier series of the form (1) the following inequalities holds:*

$$E_{\lambda_n}(f)_{\mathbf{M}} \le \frac{\pi^{2m}}{2m!K(m)} \int_0^{\pi} \tilde{\omega}_m\Big(f, \frac{u}{\lambda_n}\Big)_{\mathbf{M}} \sin u \,\mathrm{d}u,$$

where $K(m) = \sum_{j=0}^{m} (-1)^j \frac{\pi^{2m-2j}}{(2m-2j)!} + \frac{\pi^{2m}}{2m!}(-1)^m$.

In the spaces L_2 of 2π-periodic square-summable functions, the results of this kind were obtained by Abilov and Abilova [1], and Vakarchuk [2].

[1] V. Abilov, F. Abilova, *Problems in the approximation of 2π-periodic functions by Fourier sums in the space $L_2(2\pi)$*. Math. Notes, **76** (6) (2004), 749-757.

[2] S. Vakarchuk, Jackson-type inequalities with generalized modulus of continuity and exact values of the n-widths for the classes of (ψ, β)-differentiable functions in L_2. I. Ukrainian Math. J. **68** (6) (2016), 823–848.

Approximation schemes for differential functional equations and algorithms their applications

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In mathematical modeling of physical and technical processes, the evolution of which depends on prehistory, we arrive at differential equations with a delay. With the help of such equations it was possible to identify and describe new effects and phenomena in physics, biology, technology [1,2].

An important task for differential-functional equations is to construct and substantiate finding approximate solutions, since there are currently no universal methods for finding their precise solutions. Of particular interest are studies that allow the use of methods of the theory of ordinary differential equations for the analysis of delay differential equations.

Schemes for approximating differential-difference equations by special schemes of ordinary differential equations are proposed in the works [3,4].Further study of the schemes of approximation of differential-difference equations in the spaces of continuous functions on a finite interval was carried out in the work of I.M. Cherevko and L.A. Piddubna [5]. The analysis of the accuracy of the approximation of the vector delay element for different input functions and the generalization of the approximation schemes for the systems of differential-difference equations of the delay and neutral types are considered in the works of I.M. Cherevko and O.V. Matviy [6,7]. The construction and substantiation of schemes for the approximation of linear and quasilinear differential-functional