Recovery of partial differential operators on classes of periodic functions with mixed smoothness

Sholpan BALGIMBAYEVA [1]

[1] *Department of Function Theory, Institute of Mathematics and Mathematical Modeling, Almaty, Kazakhstan*
E-mail: balgimbayeva@math.kz

Abstract: We consider the problem of optimal linear recovery for mixed partial differential operator $\mathcal{A}$ on the unit ball $\mathrm{SB}_{p\theta}^r(\mathbb{T}^n)$ of the Nikol'skii–Besov space of periodic functions with mixed smoothness.

We find error bounds sharp in order for optimal linear recovery of operator $\mathcal{A}$ on class $\mathrm{SB}_{p\theta}^r(\mathbb{T}^n)$. As information $I_m^\delta(f)$ about the functions f from class $\mathrm{SB}_{p\theta}^r(\mathbb{T}^n)$ we shall use Fourier coefficients with numbers from step "hyperbolic" cross.

As the linear method using the information about Fourier coefficients, we shall consider action of the mixed partial differential operator $\mathcal{A}$ on special "private" sum of decomposition on system (type as wavelets) trigonometrical polynoms.

Keywords: Nikol'skii–Besov function space, mixed smoothness, trigonometric system, recovery of differential operator

2010 Mathematics Subject Classification: 42A10