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Online Conference

Algebraic
and Geometric
Methods of Analysis

dedicate to the memory
of Yuriy Trokhymchuk
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LIST OF TOPICS

- Topological methods in analysis
- Geometric problems of complex and mathematical analysis
- Algebraic methods in geometry
- Differential geometry in the whole
- Geometry and topology of differentiable manifolds
- General and algebraic topology
- Geometric and topological methods in natural sciences

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Nonlocal problem with integral conditions for homogeneous system of partial differential equations of second order

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Let $\Pi(T) = \{(t, x) \in \mathbb{R}^2 : t \in [0, T], x \in \mathbb{R}\}$, $T > 0$. Let us denote $E_{\alpha, \beta}$, $\alpha > 0, \beta > 0$, to the space of functions $\varphi \in L_2(\mathbb{R})$, with the finite norm [1]

$$\|\varphi\|_{E_{\alpha, \beta}} = \sqrt{\frac{1}{2\pi} \int_{-\infty}^{+\infty} |\hat{\varphi}(\xi)|^2 (1 + |\xi|)^{2\alpha} \exp(2\beta|\xi|) d\xi}$$

where $\hat{\varphi}(\xi)$ is the Fourier transform of the function $\varphi(x)$. In the strip $\Pi(T)$ we consider nonlocal-integral problem

$$L\left(\frac{\partial}{\partial t}, \frac{\partial}{\partial x}\right) u(t, x) \equiv \frac{\partial^n u(t, x)}{\partial t^n} + \sum_{j=1}^n a_j \frac{\partial^n u(t, x)}{\partial t^{n-j} \partial x^j} = 0, \quad a_j \in \mathbb{C}, \quad (t, x) \in \Pi(T), \quad (1)$$

$$\frac{\partial^k U}{\partial t} \Big|_{t=0} - \frac{\partial^k U}{\partial t} \Big|_{t=T} + \int_0^T t^k U(t, x) dt = \varphi_k(x), \quad k = 0, \dots, n-2, \quad (2)$$

$$\int_0^{T_1} t^{n-1} U(t, x) dt + \int_{T_2}^T t^{n-1} U(t, x) dt = \varphi_{n-1}(x) \quad (3)$$

where $a_1, a_2 \in \mathbb{C}$. Assuming that the real parts of roots of polynomial $\lambda^n + a_1 \lambda^{n-1} + \dots + a_n$ are nonzero and different, the correctness of the problem (1) - (3) in the space of functions $C^2([0, T], E_{\alpha, \beta})$ is established.

Obtained results continue the research of the work [2].

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