Boundary Value Problem for Fractional Diffusion-Wave Equation in Noncylindrical Domain

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In the work we discuss the first boundary value problem for the fractional diffusion-wave equation in a noncylindrical domain: *find a regular solution of the equation*

$$\left(\frac{\partial^\alpha}{\partial y^\alpha} - \frac{\partial^2}{\partial x^2}\right) u(x,y) = f(x,y) \qquad (n-1 < \alpha \le n, \quad n \in \{1,2\}).$$

in the domain

$$D = \{(x,y) : \, z_1(y) < x < z_2(y), \, 0 < y < T\},$$

with boundary conditions

$$u(z_1(y),y) = \varphi_1(y), \quad u(z_2(y),y) = \varphi_2(y), \quad 0 < y < T;$$

$$\lim_{y\to 0} \frac{\partial^{\alpha-k}}{\partial y^{\alpha-k}} u(x,y) = \tau_k(x), \quad z_1(0) < x < z_2(0), \qquad k = \overline{1,n}.$$

where $z_k(y)$, $\varphi_k(y)$ and $\tau_k(x)$ are given continuous functions, $z_1(y)$ does not decrease, $z_2(y)$ does not increase, and $z_1(y) < z_2(y)$ for all $y \in [0,T)$.