On Nonlocal Boundary Value Problems for Linear Hyperbolic Systems of Second Order

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In this talk we study the nonlocal boundary value problem the linear hyperbolic system of second order

$$u_{xy} = P_0(x,y)u + P_1(x,y)u_x + P_2(x,y)u_y + q(x,y), \tag{1}$$

$$\ell\big(u(\cdot,y)\big) = \varphi(y), \qquad h\big(u_x(x,\cdot)\big) = \psi(x), \tag{2}$$

where P_i $(i = 0,1,2)$ and q, respectively, are continuous matrix and vector functions, and $\ell : C([0,\omega_1]) \to \mathbb{R}^n$ and $h : C([0,\omega_2]) \to \mathbb{R}^n$ are bounded linear operators.

We establish:

(i) Unimprovable sufficient conditions of solvability and unique solvability of absolutely continuous (i.e. weak) and classical solutions;

(ii) Sharp a priori estimates for weak and classical solutions;

(iii) Necessary and sufficient conditions of well–posedness of problem $(1), (2)$.