

Taras Firman, Volodymyr Kyrylych

## Classical solvability of the initial-boundary value problem for countable hyperbolic system

*Ivan Franko National University of Lviv, Lviv, Ukraine  
E-mail: tarasfirman91@ukr.net, vkyrylych@ukr.net*

Let us consider the mixed problem for countable semi-linear hyperbolic system of differential equations

$$\frac{\partial u_i}{\partial t} + \lambda_i(x, t) \frac{\partial u_i}{\partial x} = f_i(x, t, u_1, u_2, \dots), \quad i \in \mathbb{N},$$

with initial conditions

$$u_i(x, 0) = g_i(x), \quad i \in \mathbb{N},$$

and nonlinear boundary conditions

$$u_{i_0}(0, t) = h_{i_0}(t, u_j(0, t)|_{j \in I_l}, u_k(l, t)|_{k \in I_0}), \quad i_0 \in I_0,$$

$$u_{i_l}(l, t) = h_{i_l}(t, u_j(0, t)|_{j \in I_l}, u_k(l, t)|_{k \in I_0}), \quad i_l \in I_l,$$

where  $I_0 = \{i | \lambda_i(0, t) > 0\}$ ,  $I_l = \{i | \lambda_i(l, t) < 0\}$ .

Under the additional conditions we prove existence unique solution of this problem.

- [1] A. Samoilenko and Yu. Teplinsky. Countable Systems of Differential Equations. Ukrainian Academy of Sciences, Kiev, Institute of Mathematics, 1993.
- [2] Firman T. Mixed Problem for Countable Hyperbolic System of Linear Equations/ T. Firman, V. Kyrylych // Azerbaijan Journal of Mathematics. – 2015. – Vol. 5. – N 2. – P. 47-60.