On a method of finding a solution of semi-periodic boundary value problem for hyperbolic equations

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Abstract: In this paper we investigate the floor semi-periodic boundary value problem for a system of hyperbolic equations with mixed derivative. An algorithm for finding an approximate solution of this problem.

In this paper, a semi-periodic boundary value problem for a system of linear hyperbolic equations is considered:

$$\frac{\partial^2 u}{\partial x \partial t} = A(x,t)\frac{\partial u}{\partial x} + C(x,t)u + f(x,t), \quad (x,t) \in \overline{\Omega} = [0,\omega] \times [0,T],$$

$$u(0,t) = \psi(t), \quad u(x,0) = u(x,T), \quad t \in [0,T], \in [0,\omega],$$

where $A(x,t), C(x,t)$ matrix of $(n \times n)$ order, $f(x,t)$ n-vector-function in continuous $\overline{\Omega}$, n-vector-function $\psi(t)$ continuously-differentiable in $[0,T]$. For her study, the interval $[0,\omega]$ is divided into M parts, and parameterization method is applied for each area. The proposed method for finding approximate solutions of semi-periodic boundary value problem for a system hyperbolic equations is illustrated by an example.

Keywords: Hyperbolic equations, decomposition, algorithm, the boundary value problem

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