

1145-35-1225

Audison Beaubrun* (abeaubrun2013@my.fit.edu), Florida Institute of Technology, Department of Mathematical Sciences, 150 W University Blvd, Melbourne, FL 32901, and **Tariel Kiguradze**, Florida Institute of Technology, Department of Mathematical Sciences, 150 W University Blvd, Melbourne, FL 32901. *Periodic Problems for Higher Order Nonlinear Hyperbolic Equations.*

For the equation

$$u^{(\mathbf{m})} = f(\mathbf{x}, \widehat{\mathcal{D}}^{\mathbf{m}}[u]), \quad (1)$$

consider the periodic

$$u(\mathbf{x} + \boldsymbol{\omega}_j) = u(\mathbf{x}) \quad (j = 1, \dots, n) \quad (2)$$

and the initial-periodic

$$u^{(\mathbf{k}_j)}(0, \widehat{\mathbf{x}}_j) = \varphi_{k_j}(\widehat{\mathbf{x}}_j) \quad (k_j = 0, \dots, m_j - 1; j = 1, \dots, n_0), \quad u(\mathbf{x} + \boldsymbol{\omega}_j) = u(\mathbf{x}) \quad (j = n_0 + 1, \dots, n) \quad (3)$$

conditions. Here $\mathbf{x} = (x_1, \dots, x_n)$, $\boldsymbol{\omega} = (\omega_1, \dots, \omega_n)$, $\boldsymbol{\omega}_j = (0, \dots, \omega_j, \dots, 0)$, $\mathbf{m} = (m_1, \dots, m_n)$, $\widehat{\mathcal{D}}^{\mathbf{m}}[u] = \left(u^{(\boldsymbol{\alpha})} \right)_{\boldsymbol{\alpha} < \mathbf{m}}$,

$$\boldsymbol{\alpha} < \mathbf{m} \Leftrightarrow \alpha_j \leq m_j \quad (j = 1, \dots, n) \quad \text{and} \quad \boldsymbol{\alpha} \neq \mathbf{m},$$

$\widehat{\mathbf{x}}_i = (x_1, \dots, x_{i-1}, x_{i+1}, \dots, x_n)$ and $\mathbf{k}_j = (0, \dots, k_j, \dots, 0)$. Necessary and sufficient conditions of solvability, unique solvability and well-posedness of problems (1), (2) and (1), (3) are established. (Received September 20, 2018)