THE QUESTIONS OF EXISTENCE OF THE PERIODIC AND LIMITED SOLUTIONS OF TRAVELLING WAVE TYPE. *

L.A.Beklaryan,   A.L.Beklaryan

beklar@cemi.rssi.ru   beklaryan@mailfrom.ru

Many applied problems lead to studing solutions of travelling waves type for infinite-dimensional dynamic systems. In the report the approach is presented by which the solutions of travelling waves type are studied for a wide class of such systems. The approach will be shown on an example of finite difference analogue of the wave equation with nonlinear potential

$$m_i \ddot{y}_i = y_{i+1} - 2y_i + y_{i-1} + \phi(y_i), \qquad i \in \mathbb{Z}, \quad t \in \mathbb{R}. \tag{1}$$

In case of a homogeneous environment (i.e. $m_i = m, \quad i \in \mathbb{Z}$) it is possible to describe all space of the solutions of travelling waves type at the general assumptions on potential in the form of Lipshchitz's condition.

The solutions of travelling waves type for system (1) are realised as the solutions of induced one-parametrical family functional-differential equations of pointwise type.

In case of the nonhomogeneous environment for system (1) there are not the solutions of travelling waves type, witch is different from stationary, or rectilinear uniform movements. In this connection, the new class of solutions in the form of quasisolutions of travelling waves type is defined.

Such quasisolution of travelling waves type for system (1) is "correct" expansion of concept of travelling waves type solution and that coincides with it in case of a homogeneous environment. The quasisolutions of travelling waves type for system (1) are realised as the impulse solutions of induced one-parametrical family functional-differential equations of pointwise type.

At the same time, in many cases important presence of solutions of travelling waves type with special properties-it is the periodic and limited solutions of travelling waves type. In frameworks of the offered approach also it is possible to receive the existence conditions both periodic, and the limited solutions of travelling waves type.

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