About the Solutions of Traveling Wave Type for Homogeneous Rod and the Quasisolutions of Traveling Wave Type for Inhomogeneous rod

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Many applied problems reduce to studing of solutions of traveling waves type for infinite-dimensional dynamic systems. In particular, there is a studing of the infinite-dimensional dynamic system in the theory of a plastic deformation

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

where the potential $\phi(\cdot)$ is setted by smooth periodic function. The equation (1) is a system with a potential of Fraenkel–Kontorova [1]. This system models a behaviour of a countable number of balls with masses equal to m, located in integer points of the real exis, where any two neighboring balls are connected by a flexible spring. The studing of such systems with different potentials is one of the intensively developing directions in the theory of dynamic systems. The studing of solutions of traveling waves type, as one of observed classes of waves, is the central problem for these system. A connection between solutions of traveling wave tape of the equation (1) and solutions of the induced differential equation with deviating argument is established.

For case inhomogeneous rod the masses $m_i, \quad i \in \mathbb{Z}$ can be different. In this case for nonzero potentials only stationary solutions are solutions of traveling wave tape, and observed of waves are the quasisolutions of traveling wave type. A connection between quasisolutions of traveling wave tape and impuls solutions of the induced differential equation with deviating argument is established.

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