FORMATION AND INTERACTION OF NONLINEAR WAVES IN THE FRAMEWORK OF THE WEAK ASYMPTOTIC METHOD

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Abstract

Applying asymptotic method on certain PDE means finding net of functions which satisfy the equation up to some discrepancy. Usually, the discrepancy is assumed to be small in the sense of C^k norms. Such approach was intensively developed in the eighties of the last century (WKB method, Maslov's method, "matching method" introduced by A.M.Il'in).

The weak asymptotic method have been introduced recently by V.G.Danilov in order to investigate nonlinear phenomenons appearing in evolutionary equations (roughly speaking, that means that an equation is defined on the half-space $(t, x) \in \mathbf{R}^n \times \mathbf{R}^n$. In the framework of this method the discrepancy is assumed to be small in the weak sense but with respect only to the variable $x \in \mathbf{R}^n$. This simple trick enables us to reduce solving of PDE on solving system of ODEs.

Consequently, problems of studying nonlinear wave formations and interactions are reduced on studying a system of ODEs.