

The Markov Moment Problem and Algorithms of the Solitary Waves Trajectories Identification in Continuous Media

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In recent years the investigation of separated waves plays an important role in many applied scientific fields. Travelling wave solutions can describe various phenomena in fluid mechanics, hydrodynamics, optics, plasma physics, solid state physics, biology, meteorology, and other fields. In this paper we consider some approaches to the problem of solitary waves trajectories identification in continuous media. In the case of solitary wave trajectory function

$$r(t) = \alpha_1 \exp(-\xi_1 \phi(t)) + \alpha_2 \exp(-\xi_2 \phi(t)) + \dots + \alpha_m \exp(-\xi_m \phi(t)) \quad (1)$$

problem of trajectory identification is reduced to checking the compatibility of the system of nonlinear equations:

$$\alpha_1 \exp(-\xi_1 \phi_i) + \alpha_2 \exp(-\xi_2 \phi_i) + \dots + \alpha_m \exp(-\xi_m \phi_i) = r_i, \quad (2)$$

$i = 1, 2, \dots, k$, where $\alpha_1, \xi_1, \alpha_2, \xi_2, \dots, \alpha_m, \xi_m$ -unknown parameters, ϕ_i, r_i -given values. To solve the exponential moment problem which is determined by the system (2) we reduce (2) to the classical case of the Chebyshev system $F = (1, t, t^2, \dots, t^m)$.

- [1] Mariana Turbal, Yuriy Turbal, Andriy Bomba and Radoveniuk Olena Method of Earthquake Prediction Based on the Soliton Mechanisms of Some Shocks *Journal of Environmental Science and Engineering* **1**, (2012), p. 11-20.
- [2] Yuriy Turbal, Mariana Turbal, Andriy Bomba and Sokh Anastasiia T-transformation method for studying the multi-solitone solutions of the Korteweg-de Vries type equations *Journal of Mathematic and System Science* **2**, (2015), p. 81-86.