

# On a Nonlocal Ostrovsky-Whitham Type Dynamical System, Its Riemann Type Inhomogeneous Regularizations and Their Integrability

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Short-wave perturbations in a relaxing medium, governed by a special reduction of the Ostrovsky evolution equation, and later derived by Whitham, are studied using the gradient-holonomic integrability algorithm. The bi-Hamiltonicity and complete integrability of the corresponding dynamical system is stated and an infinite hierarchy of commuting to each other conservation laws of dispersive type are found. The well defined regularization of the model is constructed and its Lax type integrability is discussed. A generalized hydrodynamical Riemann type system is considered, infinite hierarchies of conservation laws, related compatible Poisson structures and a Lax type representation for the special case  $N=3$  are constructed.

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