

Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

A new deep water equation for unidirectional surface gravity waves in two dimensions NAIL S. USSEMBAYEV, KAUST — Using Hamiltonian theory of weakly nonlinear surface waves we derive a set of nonlinear evolution equations describing propagation of unidirectional gravity waves on the surface of a two-dimensional ideal fluid of infinite depth. The proposed equations admit an exact solution in terms of Lamberts W -function. We compare this solution with the approximate irrotational solution due to Stokes (1847) and the exact rotational solution found by Gerstner (1802). Being irrotational and exact, our solution exhibits a distinctive advantage over the aforementioned classical examples of deep-water gravity waves.

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Date submitted: 31 Jul 2019

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