

Weakly Non-local Solitary Wave Solutions of a Singularly Perturbed Boussinesq Equation

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We study the singularity perturbed (sixth-order) Boussinesq equation recently introduced by Daripa and Hua [Appl. Math. Comput. 101 (1999) 159]. This equation describes the bi-directional propagation of small amplitude and long capillary-gravity waves on the surface of shallow water for bond number less than but very close to $1/3$. On the basis of far-field analyses and heuristic arguments, we show that the traveling wave solutions of this equation are weakly non-local solitary waves characterized by small amplitude fast oscillations in the far-field. Using various analytical and numerical methods originally devised to obtain this type of weakly non-local solitary wave solutions of the singularly perturbed (fifth-order) KdV equation, we obtain weakly non-local solitary wave solutions of the singularly perturbed (sixth-order) Boussinesq equation and provide estimates of the amplitude of oscillations which persist in the far-field. © 2001 IMACS. Published by Elsevier Science B.V. All rights reserved.

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