

An integrable evolution equation for surface waves in deep water

Submitted by Herv  Leblond on Wed, 12/03/2014 - 09:09

Titre An integrable evolution equation for surface waves in deep water

Type de publication Article de revue

Auteur Kraenkel, R A [1], Leblond, Herv  [2], Manna, Miguel Alberto [3]

Editeur IOP Publishing

Type Article scientifique dans une revue   comit  de lecture

Ann e 2014

Langue Anglais

Date May-01-2015

Num ro 2

Pagination 025208

Volume 47

Titre de la revue Journal of Physics A: Mathematical and Theoretical

ISSN 1751-8113

R sum  en anglais

In order to describe the dynamics of monochromatic surface waves in deep water, we derive a nonlinear and dispersive system of equations for the free surface elevation and the free surface velocity from the Euler equations in infinite depth. From it, and using a multiscale perturbative method, an asymptotic model for small wave steepness ratio is derived. The model is shown to be completely integrable. The Lax pair, the first conserved quantities as well as the symmetries are exhibited. Theoretical and numerical studies reveal that it supports periodic progressive Stokes waves which peak and break in finite time. Comparison between the limiting wave solution of the asymptotic model and classical results is performed.

URL de la notice <http://okina.univ-angers.fr/publications/ua5732> [4]

DOI 10.1088/1751-8113/47/2/025208 [5]

Lien vers le document <http://iopscience.iop.org/1751-8121/47/2/025208> [6]

Titre abr g  J. Phys. A: Math. Theor.

Liens

[1] [http://okina.univ-angers.fr/publications?f\[author\]=9672](http://okina.univ-angers.fr/publications?f[author]=9672)

[2] <http://okina.univ-angers.fr/herve.leblond/publications>

[3] [http://okina.univ-angers.fr/publications?f\[author\]=8697](http://okina.univ-angers.fr/publications?f[author]=8697)

[4] <http://okina.univ-angers.fr/publications/ua5732>

[5] <http://dx.doi.org/10.1088/1751-8113/47/2/025208>

[6] <http://iopscience.iop.org/1751-8121/47/2/025208>

Publi  sur *Okina* (<http://okina.univ-angers.fr>)