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Existence by minimisation of solitary water waves on an ocean of infinite depth. (English)

Zbl 1109.76013

[Ann. Inst. Henri Poincaré, Anal. Non Linéaire 21, No. 4, 503-516 \(2004\).](#)

Summary: The abstract minimisation method introduced in a recent work by *E. Séré, J.F. Toland* and the author [Minimisation methods for quasi-linear problems, with an application to periodic water waves, preprint] gives a new proof of the existence of capillary-gravity solitary water waves on the surface of a two-dimensional ocean of infinite depth. This problem was first studied by *G. Iooss* and *P. Kirrmann* [Arch. Ration. Mech. Anal. 136, 1–19 (1998; Zbl 0879.76011)] in the setting of normal form theory for reversible infinite-dimensional “spatial” dynamical systems.

MSC:

- 76B15 Water waves, gravity waves; dispersion and scattering, nonlinear interaction
- 35B38 Critical points of functionals in context of PDEs (e.g., energy functionals)
- 35A15 Variational methods applied to PDEs
- 35Q35 PDEs in connection with fluid mechanics
- 35S10 Initial value problems for PDEs with pseudodifferential operators
- 47J30 Variational methods involving nonlinear operators

Cited in 3 Documents

Keywords:

Capillary-gravity water waves; solitary waves; variational methods

Full Text: [DOI](#) [Numdam](#) [EuDML](#)

References:

- [1] Babenko, K.I, Some remarks on the theory of surface waves of finite amplitude, Soviet math. dokl., 35, 599-603, (1987) · Zbl 0641.76007
- [2] Babenko, K.I, On a local existence theorem in the theory of surface waves of finite amplitude, Soviet math. dokl., 35, 647-650, (1987) · Zbl 0641.76008
- [3] B. Buffoni, Existence and conditional energetic stability of capillary-gravity solitary water waves by minimisation, preprint · Zbl 1110.76308
- [4] Buffoni, B; Dancer, E.N; Toland, J.F, The regularity and local bifurcation of steady periodic water waves, Arch. rational mech. anal., 152, 207-240, (2000) · Zbl 0959.76010
- [5] B. Buffoni, É. Séré, J.F. Toland, Surface water waves as saddle points of the energy, Calculus of Variations and Partial Differential Equations, submitted for publication · Zbl 1222.76019
- [6] B. Buffoni, É. Séré, J.F. Toland, Minimisation methods for quasi-linear problems, with an application to periodic water waves, preprint · Zbl 1077.76058
- [7] Garabedian, P.R, Surface waves of finite depth, J. anal. math., 14, 161-169, (1965) · Zbl 0128.44502
- [8] Iooss, G; Kirrmann, P, Capillary gravity waves on the free surface of an inviscid fluid of infinite depth, existence of solitary waves, Arch. rational mech. anal., 136, 1-19, (1998) · Zbl 0879.76011
- [9] Logan, B.F, Hilbert transform of a function having a bounded integral and a bounded derivative, SIAM J. math. anal., 14, 247-248, (1983) · Zbl 0507.44006
- [10] Stuart, C.A, Bifurcation into spectral gaps, (1995), Bull. Belg. Math. Soc. Simon Stevin · Zbl 0864.47037
- [11] Stuart, C.A, Bifurcation from the essential spectrum, (), 397-443 · Zbl 0888.47045
- [12] Turner, R.E.L, A variational approach to surface solitary waves, J. differential equations, 55, 401-438, (1984) · Zbl 0574.76015
- [13] Zygmund, A, Trigonometric series I, II, (1959), Cambridge University Press Cambridge · Zbl 0628.42001

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