Nat. Hazards Earth Syst. Sci. Discuss., 1, C1051–C1053, 2013
www.nat-hazards-earth-syst-sci-discuss.net/1/C1051/2013/

Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Rogue waves in a wave tank: experiments and modeling" *by* A. Lechuga

A. Lechuga

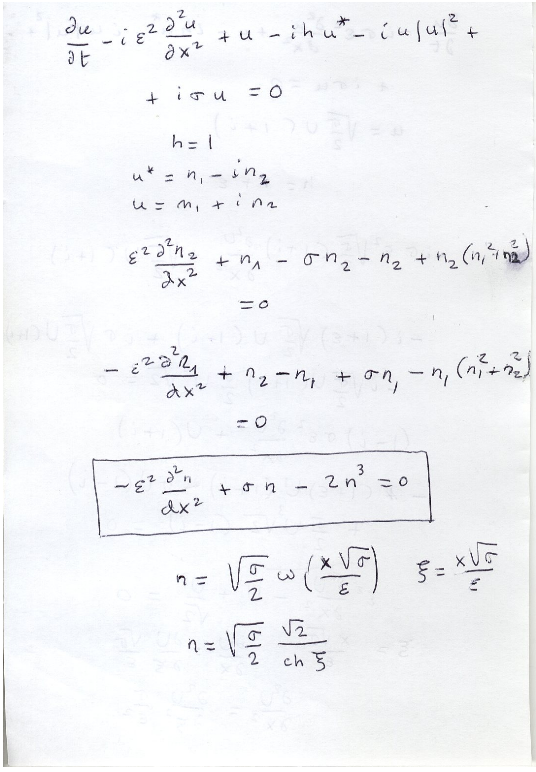
antonio.lechuga@cedex.es

Received and published: 3 September 2013

As the anonymous referee wrote in his comments 'the scaling is irrelevant in the context of the present study', however to simplify matters all the drawings have been made in space (with units of the 'real' tank). Fortunately both scales horizontal and vertical are the same 1/39, so the waveform is preserved in figures 4 and 8. The only used 'leisure'(common in structural models) has been to put the ordinate in prototype units(39 times its real value). As the matter of fact we generated a specific wave train with given characteristics(its regularity and its permanence) without assuming or not its stability. The wave height is of a few decimeters.This train presents an energy concentration(in the way proposed by Akhmediev et al 2011a)after adjusting 'painstakingly' a sort of triangular density spectrum. Given the regularity and permanency of the wave train(not only in space but also in time)we did not need more than three wave sensors

to measure the generated waves, according to the used symmetrical spectrum. Equation 1 is evidently dimensionless and in this case there is not inconsistency. Measured results compare reasonably well with the GL solution. To clarify GL solution please see the figure below.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 3201, 2013.



$$\frac{\partial u}{\partial t} - i\varepsilon^2 \frac{\partial^2 u}{\partial x^2} + u - ihu^* - iu|u|^2 + i\sigma u = 0$$

$$h = 1$$

$$u^* = n_1 - in_2$$

$$u = n_1 + in_2$$

$$\varepsilon^2 \frac{\partial^2 n_2}{\partial x^2} + n_1 - \sigma n_2 - n_2 + n_2(n_1^2 + n_2^2) = 0$$

$$-\varepsilon^2 \frac{\partial^2 n_1}{\partial x^2} + n_2 - n_1 + \sigma n_1 - n_1(n_1^2 + n_2^2) = 0$$

$$\boxed{-\varepsilon^2 \frac{\partial^2 n}{\partial x^2} + \sigma n - 2n^3 = 0}$$

$$n = \sqrt{\frac{\sigma}{2}}\,\omega\left(\frac{x\sqrt{\sigma}}{\varepsilon}\right) \qquad \xi = \frac{x\sqrt{\sigma}}{\varepsilon}$$

$$n = \sqrt{\frac{\sigma}{2}}\,\frac{\sqrt{2}}{\mathrm{ch}\,\xi}$$

Fig. 1. Solution of the GL equation