Workshop on nonlinear water waves and related phenomena

Date: 19 February, 2018

Venue: Lecture room 3, Environmental Studies Building, Kashiwa Campus, the University of Tokyo

13:00 Opening

13:05 Lecture by Elena Tobisch (Johannes Kepler Universitat Linz)
"Exact and detuned resonances with small frequency mismatch in resonance conditions"

> Dr. Tobisch is a leading scientist in the study of nonlinear resonance analysis and is willing to share her new mathematical and numerical results on detuned resonances that are contra-intuitive and interesting. The numerical results are obtained for 3-wave systems of Rossby waves on a sphere and on a periodical β-plane. Qualitatively, the same results will be valid for any 3-wave system.
> http://www.dynamics-approx.jku.at/lena/

15:00 Takuji Waseda and Tomoyuki Hirobe (University of Tokyo) "Numerical and Experimental studies on resonant interaction under influence of wind and current"

> Four-wave interaction of surface gravity waves are studied experimentally in a laboratory wave basin with water circulation, and numerically with an air-sea coupled Navier-Stokes solver with free surface. The interpretation of the results are given incorporating the effect of external forcing to the resonance detuning term.

15:40 Wataru Fujimoto (University of Tokyo) "Impact of the four-wave quasi-resonance to the freak wave patterns in the real ocean"

> The freak wave shapes should be relevant to the structural load on ships in the limit state. This study investigated possible shape of a freak wave observed in deep water condition. The comparison between second- and third-order nonlinear DNS simulations revealed that third-order wave interactions resulted in distortion of freak-wave shape.

16:20 Sunao Murashige (Ibaraki University) "Large amplitude motion of periodic internal waves in a two fluid system of finite depth"

> This work proposes a new type of long wave model for irrotational plane motion of periodic internal waves propagating on the interface between two homogeneous-density fluids. In the derivation of this model, the flow domain is conformally mapped onto the complex velocity potential plane, and smallness of wave amplitude is not assumed. Numerical examples show that this model can be applied to large amplitude waves, and give overhanging solutions which cannot be reproduced by any other long wave models.

17:00 Discussion

17:30 Closing